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SOCIO-ECONOMIC ASSESSMENT

VOLUME II

IMPACT ANALYSIS

C-b SHALE OIL PROJECT
ASHLAND OIL, INC.
SHELL OIL CO. OPERATOR

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OIL SHALE TRACT C-b

SOCIO-ECONOMIC ASSESSMENT

VOLUME II

IMPACT ANALYSIS

Prepared in Conjunction With
the Activities Related to
Lease C-20341 Issued Under
the Federal Prototype Oil
Shale Leasing Program

March, 1976

C-b SHALE OIL PROJECT
ASHLAND OIL, INC.
SHELL OIL CO., OPERATOR

March 3 1849

United States Department of the Interior

GEOLOGICAL SURVEY
Conservation Division
Area Oil Shale Supervisor's Office
Mesa Federal Savings & Loan Bldg.
131 N. 6th - Suite 300
Grand Junction, Colorado 81501

April 6, 1976

Memorandum

To: William Rogers, Chairman, OSEAP

From: Area Oil Shale Mining Supervisor

Subject: C-b Shale Oil Project, "Socio-Economic Assessment and Impact Analysis"

Fifty copies of the subject report will be made available to Panel members at the April 7-8, 1976 OSEAP meeting. This document is not a required part of the C-b Detailed Development Plan and is not subject to approval. These copies are furnished for the Panel's information.

Peter A. Rutledge

Peter A. Rutledge

TN

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CHAPTER I

GENERAL INTRODUCTION AND SUMMARY

CHAPTER I GENERAL INTRODUCTION AND SUMMARY

A. Introduction

This report presents projections of socio-economic impacts related to development of Federal Lease Tract C-b. The report adds to other efforts at the local, regional, state and federal levels. The information presented deals with impacts occurring primarily from the C-b project, although regional development issues are addressed in the final chapter. The information in this document reflects conditions in Garfield, Mesa and Rio Blanco Counties for the period 1975 to 1976.

The document discusses many impacts and procedures for managing or mitigating the impacts. However, no set of projections can precisely portray every future occurrence. For example, one of the cited issues involved in forecasting socio-economic impacts is the timing and phasing of industry developments. The actual construction schedule of any single plant will affect the ability of an area to manage growth related to its development. The magnitude and span of the construction phase are important issues related to growth management. If more than one project begins at approximately the same time, the construction schedules of all of the plants bear heavily on the growth likely to occur as well as the area's ability to deal with it.

At this writing it is not possible to foresee how much development will take place at a given time. The construction and operation schedules, manpower build-up and population projections presented in this report are related to development of a 50,000 barrel per day oil shale plant to be built and operated over a period of about 30 years. Any variation on the schedules given will probably affect the utility of these projections.

B. Overview of the Chapters

After this section, the remainder of Chapter I summarizes the impacts resulting from development of Tract C-b. The chapter reviews the nature of the socioeconomic impacts, the requirements for growth management, estimates of the financial costs and benefits of the project, the source of front end financing and some optional settlement patterns.

Chapter II describes employment and population build-up related to development of the plant and mines. Construction and operation schedules are given, as well as estimated salaries, the estimated proportions of basic plant workers to service workers outside of the plant and the total induced population.

Chapter III shows the projected settlement patterns for the area around Tract C-b. The location of the tract, factors affecting the pattern of growth, alternative development scenarios and the phases of community development are discussed. Estimates of population growth for Rifle and Meeker are made based on the growth scenarios.

Chapters IV and V give specific information on housing and municipal and human services in Rifle and Meeker. The information is presented to familiarize the reader with the current state of community development in the Rifle and Meeker areas. These chapters indicate also whether or not the municipalities can meet housing and services needs for additional people based on the current situation or on expansions proposed for the near future.

Chapter VI provides demand and cost impact projections for housing and municipal and human services for the Tract C-b induced population. The chapter covers housing projections and costs, municipal service demands and costs, human services needs and costs and summarized costs per capita for a community of 10,000 and for alternative development patterns.

In Chapter VII is found a discussion of the economic impacts of the proposed action. The chapter details impacts on employment and the structure of the local economy, impacts on regional wage scales and impacts on public revenues.

The final chapter, Chapter VIII, takes up mitigation of the impacts related to development of Tract C-b. The areas requiring mitigating action are indicated and program proposals suggested by the Colorado West Area of Governments for regional growth management are given. Finally, the Operator's commitment to a successful growth management program is spelled out.

C. Nature of the Socio-economic Impacts

The major socio-economic impacts of the proposed development of a commercial oil shale plant on Federal Lease Tract C-b are: (1) the population growth resulting from the new work force required for the construction and operation of the proposed project; (2) the demand for housing, municipal and human services generated by the new population; and (3) the impacts on the local and regional economy including new employment opportunities at higher wage scales, new public revenues produced by the proposed project, and changes in the structure of the economy due to shifts in the relative importance of the basic economic sectors.

The area of impact as defined for the purpose of this report includes Rio Blanco, Garfield and Mesa Counties. It is anticipated that Mesa County will experience a negligible population increase associated with development of Tract C-b, and that the majority of the impact will be centered in Rio Blanco County where the Tract is located, with significant, though lesser, impacts in Garfield County. (See Figure I-1.)

The population growth associated with the proposed project will have a significant impact on the communities in Rio Blanco and Garfield Counties in addition to the demand for housing and municipal services. Rapid urbanization will bring about changes in the rural quality of life as well as shifts in the demographic characteristics of the population.

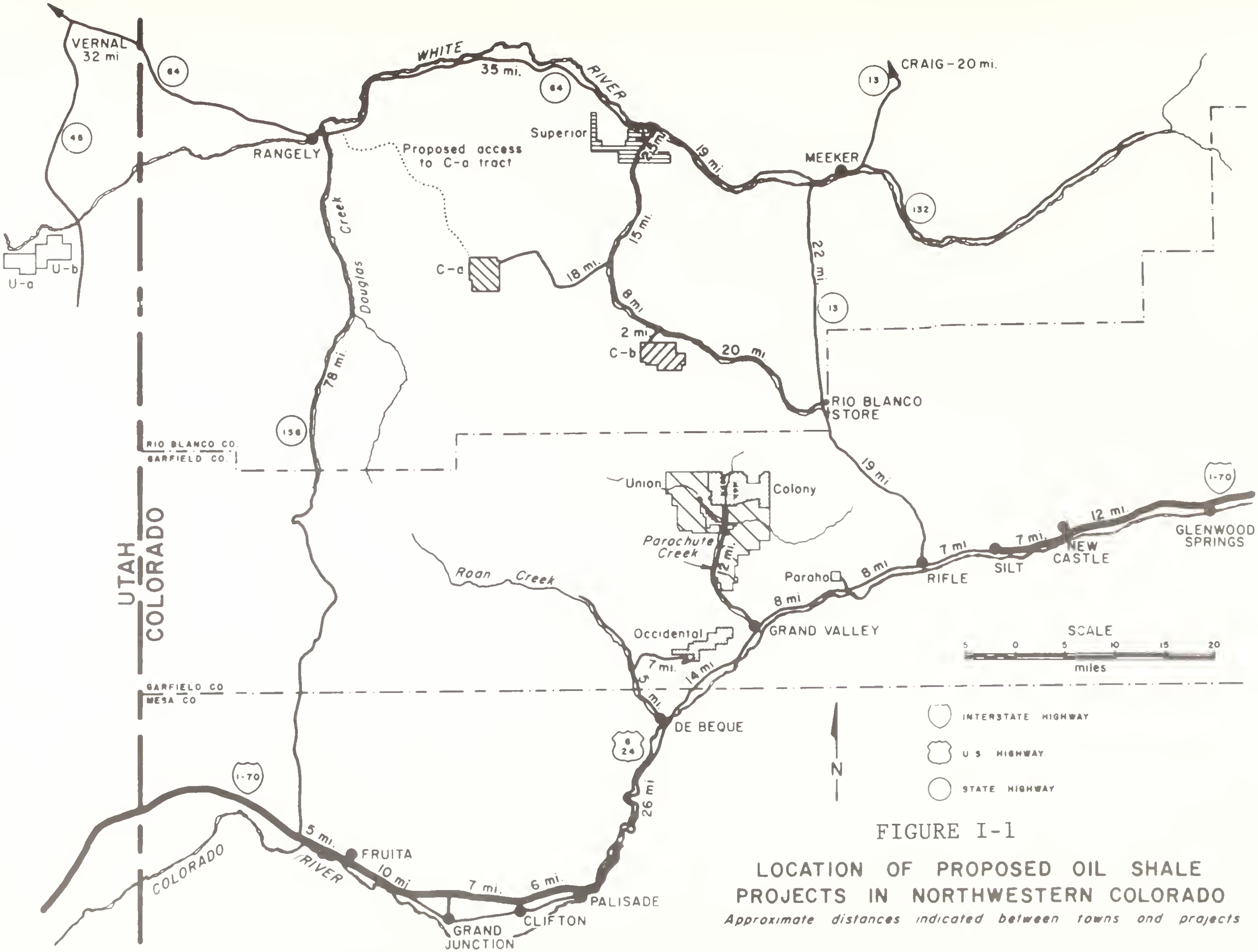

FIGURE I-1

LOCATION OF PROPOSED OIL SHALE PROJECTS IN NORTHWESTERN COLORADO

Approximate distances indicated between towns and projects

The rural quality of life is valued by residents of the area primarily for those aspects which distinguish small rural communities from urban areas. The recreational and aesthetic pleasures of the natural environment are readily accessible to these residents. Also, the small towns provide residents with a sense of personal significance, control, and influence over their political and social environment which is difficult to achieve in the rapid pace of an urban setting. The major stated disadvantages of rural living are limited economic opportunities, lower wages, and undiversified commercial and municipal facilities and services.

The state of the economy is of primary importance to most residents of the region. Recent opinion studies consistently show that they are desirous of greater economic development, and are aware of the trade-offs involved.[1] If oil shale development occurs, changes in the rural quality of life resulting from population growth and urbanization are predictable. Some of these inevitable and irreversible changes will not be amenable to mitigating action.

This report focuses primarily on those aspects of the socio-economic impact which are amenable to action: the orderly provision of housing, municipal and human services and the encouragement of environmentally sound patterns of residential development. A positive approach toward the handling of the demand for housing and services as well as toward environmentally sound planning of settlement patterns can go a long way to minimize adverse changes in the desirable aspects of the rural quality of life as growth occurs, and optimize the benefits of economic development in a region with considerable natural assets.

Although difficult, it is clearly possible to manage growth in such a way as to maximize the long term advantages of urbanization and minimize its disadvantages. The near term social and psychological disruption, which is one of the most dramatic consequences of a boom town syndrome, is also primarily a result of the lack of planning and management in the timely provision of housing and services. Therefore, while growth and urbanization are inevitable impacts, except insofar as these are thought to be undesirable in themselves, the long range disadvantages of unsound settlement patterns, such as sprawl, and the immediate social and psychological disruption of the boom town,are in no sense an inevitable part of the problem, and can be avoided.

The effective management of growth also is related to the economic impacts, as well as the social and psychological impacts, of the proposed action. Equitable and efficient handling of the costs of municipal expansion can optimize the economic benefits to be derived from the development of Tract C-b. For example, the orderly provision of housing and services will reduce the inflation associated with unmet needs; effective planning can reduce the cost of municipal expansion by 30 percent to 40 percent;

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1. Bickert, July, 1973, p. 57.

and policies to maximize local employment can both reduce the population impact and enhance the local economic benefits by increasing job opportunities, wage scales and public revenues.

D. Requirements for the Management of Growth

The population impacts of development pose three major interrelated problems:

(a) the timely provision of adequate front end financing for municipal expansion;

(b) the timely provision of housing, municipal and human services at acceptable levels of cost and quality;

(c) effective regional planning to encourage environmentally sound patterns of community development.

In recent months public attention has been focused on the need to insure the availability of sufficient front end financing for municipal expansion. While front end financing is a critical requirement, financing alone cannot solve the above problems. The mitigation of the socio-economic impacts of an oil shale plant is as much a management problem as it is a problem of financing. The provision of front end financing is itself not a question of a long range deficit, but rather a problem of timing, since public revenues generated by the proposed action will significantly exceed the costs of municipal expansion. In addition, the need for front end financing involves the difficult political and administrative problem of revenue transfer, or equalization between political subdivisions in those cases where the proposed project and new tax base may be located in a different political subdivision than much of the population impact. Ultimately, revenue equalization is a problem solvable only by governmental action, but the issue can be minimized through the careful planning of the locations for community development.

The orderly provision of housing and services at acceptable levels of quality and cost poses significant, though solvable, planning and management problems. The most important of these is first, the rapid provision of temporary facilities and services for the construction force and their orderly phaseout as the smaller permanent population moves in, and second, the extensive lead time requirements for adequate planning of community development, especially for the initial influx of construction workers.

Since the size of the total population at the peak of construction exceeds the size of the permanent population, and the influx is both rapid and variable, housing and services must be provided in such a way as to maximize flexibility for expansion, minimize front end costs and avoid excess capacity in the long run. Modular construction of sewer and water facilities and schools is one solution to this problem.

A minimum of twelve to eighteen months is required for the adequate planning of community development to insure that housing and services will be available when needed. This extensive lead time requirement means that the Venture must commence planning for community development well in advance of construction on the Tract, at a time when construction plans themselves may not be entirely firm, and commence actual community development efforts, as well, many months in advance of construction on the Tract.

Although careful planning by the Venture is essential, it is, of course, no substitute for thorough planning by local government. To support planning by the counties and municipalities involved, the Venture provided a grant of $40,000 to Rio Blanco County. Also, a joint industry-government growth monitoring system for the region is being established. The growth monitoring system will provide growth projection, information on growth on a continuing basis as it occurs, and facilitate standardization of county mapping and population accounting procedures within the oil shale region.

Rio Blanco County used their planning grant, together with a similar grant from Tract C-a, to develop a master plan and growth policy for the county and for Meeker and Rangely specifically. The county is also undertaking feasibility, engineering and design studies for a new sanitation system, a new water system and a new school in Meeker. Meeker's growth policy seeks to minimize the use of agricultural land for residential development, to preserve the character of the existing community and town center, to concentrate new residential expansion in those areas where it can be most easily accommodated, and to require that long-term permanent housing plans accompany proposals for expansion or development of mobile home facilities. The growth policy of the county seeks to minimize sprawl and strip development along major industrial access routes and to concentrate new growth within the existing communities.

E. Socio-economic Costs and Benefits of the Proposed Action

1. The Magnitude and Requirements of Growth

Development of Tract C-b is planned to take place in four phases: Mine Development (Phase I), Plant Construction (Phase II), Plant Operations (Phase III), and Post-Operations (Phase IV) which includes reclamation. Phase I will involve preliminary construction of roads and surface facilities, shaft sinking for the pilot mine and pilot mining. Construction of the commercial mine and plant will commence in the fifth year of the project and continue until the plant has been completed in year eight. The plant itself is expected to be designed for an operating life in excess of 20 years. Calculations used in this study are based on an estimated, maximum, operating plant life of 22 years.

While the Mine Development and Plant Construction phases both require variable numbers of construction employees, depending on timing and the nature of the task, the direct peak employment during these phases is estimated to be approximately 425 and 3,325, respectively. Roughly 1,200 permanent employees will be required for operation of the plant during Phase III (see Table I-1).

Service employment in such support services as grocery stores, gas stations, banks and restaurants will increase to meet the needs of the new population. The total peak population during the Mine Development Phase

Table I - 1

PROJECTED EMPLOYMENT AND POPULATION BUILD-UP FOR THE TRACT C-b SHALE OIL FACILITY

Development Stages	Phase Year	Cumulative Years	Total Construction Force	Total Operations Personnel	Total Basic C-b Employment	Total Basic C-b Population	Basic to Service Employment Multiplier	Total Induced Service Employment	Total Induced Service Population	Total Employment	Total Population
Phase I	1	1	–	–	–	–	–	–	–	–	–
Mine	2	2	370	55	425	1,097	.5	212	316	637	1,413
Development	3	3	328	62	390	1,014	.5	195	291	585	1,304
	4	4	–	59	59	184	.5	30	45	89	229
	5	5	–	59	59	184	.5	30	45	89	229
Phase II	1	6	672	103	775	2,002	.5	387	577	1,162	2,579
Plant	2	7	1,717	233	1,950	5,021	.75	1,463	2,179	3,413	7,200
Construction	3	8	3,015	310	3,325	8,506	1.0	3,325	4,954	6,650	13,461
	4	9	2,670	370	3,040	7,831	1.0	3,040	4,530	6,080	12,361
Phase III	1	10	451	799	1,250	3,624	1.25	1,563	2,328	2,813	5,953
Operation	2	11	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	3	12	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	4	13	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	5	14	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	6	15	0	1,123	1,123	3,507	1.50	1,684	2,511	2,807	6,018
	7	16	0	1,145	1,145	3,578	1.50	1,718	2,559	2,863	6,137
	8	17	0	1,154	1,154	3,606	1.50	1,731	2,579	2,885	6,185
	11	20	0	1,172	1,172	3,662	1.50	1,758	2,618	2,930	6,280
	22	31	0	1,172	1,172	3,662	1.50	1,758	2,618	2,930	6,280

Notes: Manpower estimates represent the 1st peak month within each year if 2 months have identical manpower requirements.

and Plant Construction Phase, including direct employees, their families, service workers and their families, is estimated to be roughly 1,400 and 13,500, respectively. The total permanent population once the proposed project is in operation is estimated to be between 6,000 and 6,500.

Estimates of the anticipated population are highly dependent on the basic to service employment multiplier and on the family size multiplier, which are not subject to precise calculation and can be only roughly estimated. Estimates of the population associated with the development of Tract C-b differ slightly from the most recent estimates available for the proposed Colony project because of differences in the phasing of development, differences in the construction techniques used and minor improvements in the multiplier assumptions, based on more recent data concerning rapid growth situations. Assumptions underlying the population projections are discussed in detail in the report.

The new population associated with the proposed project will require housing and the full range of services, such as schools, health services, water and sanitation, fire and police protection, utilities and roads. When these requirements are compared to the elasticity and condition of existing housing and services in the area it is clear that they are operating near capacity.

2. The Costs of Municipal Expansion

Rough estimates of the cost of providing new housing and municipal services can be made using both specific engineering estimates for proposed new facilities in the area, where available, and rule of thumb construction estimates for various units of population increase. Although in practice the population growth associated with the construction and operation of the plant will require development of new municipal infrastructure as a whole, for purposes of a costs and revenues overview, those costs associated specifically with the needs of the new population of a single project can be estimated.

For example, if the municipal water system is inadequate for the existing population or anticipated normal growth and must be replaced, the cost estimate is prorated so as to distribute a reasonable percentage of the cost to the existing population and a percentage to the new population. Although in practice the first oil shale plant in an area may require a new or upgraded highway, the highway costs are prorated to permit cost estimates for a single project. It also should be noted that costs for new communities are higher than costs of expanding existing communities.

The costs of expanding existing communities to accommodate the total permanent population associated with the proposed project fall into two categories of expenses: one time front end costs, and continuing maintenance and operation costs. Front end costs include initial planning and and growth management by county and municipal governments, site acquisition and development, construction, and equipment. Continuing operation costs for the new population include governmental planning and administration, maintenance and routine operation expenses. The following categories provide a rough estimate of the direct costs of municipal expansion, excluding the cost of housing which is assumed to be borne by the new residents themselves: the cost of debt service should the communities borrow the front end financing; and the additional costs of temporary municipal facilities and services specifically for the construction force, over and above that which can be used for the permanent population.

For a permanent population of roughly 6,300 associated with the proposed project, the front end costs of municipal expansion are estimated to be approximately $5,751 per capita, excluding state and county highway costs, and $7,997 including highways, in 1975 dollars. The total front end costs for the new population would be roughly $36 million, excluding highways, and $50 million, including highways. Assuming approximately $1,200 per capita for operation, maintenance and routine planning and governmental costs, total annual operating costs would be roughly $7.5 million for the new population (see Tables I-2 and 3). These are realistic estimates of the basic community costs and include an inventory of the anticipated public costs associated with the project. Housing costs are not included.

3. Revenue Projections

Once the proposed project is operational, it will generate over $11 million per year in public revenues based on conservative estimates. Revenues will include individual and corporate property taxes, individual income taxes and individual and corporate sales and use taxes. Of that, approximately $6.5 million per year will be produced in property tax revenues from the proposed project. More than $549 million will be paid in wages alone during the 31 years the Project is in existence.

In the case of Rio Blanco County, property taxes in excess of $8 million per year would be double the current property tax of approximately $4 million. After the added new costs of routine operation and maintenance for expanded municipal services are deducted, the total front end costs of $26 million, ($50 million including highways) described in Table I-2, could be fully recovered within fifteen years after the Project begins based on property taxes alone. Assuming operation and maintenance costs of $7.5 million per year, almost $3.5 million in total public revenues still would be available on a continuing basis to repay front end costs (see Table I-4).

In terms of purely economic costs and returns, it is clear that the revenue to be generated will exceed the costs of municipal expansion. As shown in Table I-5 total revenues equal $273.3 million which provide an excess of $27.4 million when total capital expenditures (excluding highway costs) and operation and maintenance costs are substracted. As of April, 1976 Colorado will have received approximately $26.5 million from the C-b Project Lease monies and $47.3 million from the C-a Project Lease monies for a total of about $73.8 million attributable to the two Federal Lease Tracts. This does not include interest.

Table I - 2

ESTIMATED TOTAL MUNICIPAL SERVICES COSTS RELATED TO PERMANENT TRACT C-b POPULATION IMPACT

(Per capita capital, operation, and
maintenance costs for 6280 people)

	Estimated Costs Per Capita	
Services	Capital & One-Time Front End Costs	Operation & Maintenance
Summary		
TOTAL PER CAPITA	$ 7,997.47	$ 1,204.41
Per Capita Excluding State and County Capital Costs	5,751.47	
Total Costs for 6280 Population Excluding State and County Roads	36,119,231.60	
Total Costs for 6280 Population	50,224,111.60	7,563,694.80
Total Per Basic Job Cost at 5.36 Persons Per Basic Job Without State and County Highways	30,827.88(a)	
Total Per Basic Job Cost at 5.36 Persons Per Basic Job	42,866.44	6,455.64

Notes: (a) 6280 people divided by 1172 workers = 5.53 x $5,751.47 = $30,827.88

Table I - 3

ITEMIZED ESTIMATES OF MUNICIPAL AND HUMAN SERVICES COSTS

(Per Capita Capital, Operations, and Maintenance Costs per Year for a population base of 10,000)

	Estimated Costs Per Year	
	Capital & One-Time Front End Costs	Operation % Maintenance Cost Per Year
1. Transportation		
Municipal Streets and Roads	1,193.00	
State and County Highways	2,246.00	87.19
2. Schools		
Nursery	111.00	29.21
Elementary	778.00	179.58
Junior and Senior High School	796.00	146.37
Vocational-Technical programs	542.40	109.72
Higher Education	199.30	74.48
3. Water System	257.00	18.44
4. Sewerage	277.00	13.52
5. Storm Drainage	93.75	. . .
6. Solid Waste	9.02	10.05
7. Open Space and Recreation	242.00	17.50
8. Government Regulation	22.50	50.53
9. Growth Planning and Consultation	214.97	. . .
10. Police	19.21	20.12
11. Fire	96.28	24.77
12. Library	48.00	7.40
13. Health and Medical	137.00	74.17
Other Human Services		
14. Mental Health		12.25
15. Developmental Disabilities		2.88
16. Physical Rehabilitation		2.50
17. Social Services		89.65
18. Public Health		9.23
19. Elderly Services	708.00	41.72
20. Juvenile Corrections		18.02
21. Adult Corrections		52.56
22. Cemeteries	7.04	. . .
23. Interest on General Debt		55.20
24. Other (5% of 1147.06 total o/m)		57.35
TOTAL	7997.47	1204.41
TOTAL LESS STATE AND COUNTY HIGHWAYS	5751.47	

Table I - 4

PROJECTED PROPERTY, INCOME, SALES AND USE TAXES GENERATED BY THE C-b PROJECT BY YEAR FOR A 31 YEAR PROJECT

Phase	Phase Year	Cumulative Years	Rio Blanco Property Tax (on C-b Project) Collected[a]	Total Impacted Counties Property Tax - Individual Collected	Income Tax (Wages)	Sales & Use Tax		Total
						Wages	Non-wages	
Phase I	1	1	–	–	–	–	–	–
Mine	2	2	–	–	602,766	297,837	–	902,603
Development	3	3	–	246,924	630,696	311,638	–	1,189,258
	4	4	–	221,948	79,929	39,494	–	341,371
	5	5	–	51,522	79,929	39,494	–	176,945
Phase II	1	6	–	56,311	964,689	476,670	60,975	1,558,645
Plant	2	7	228,265	451,971	2,751,198	1,359,416	223,575	5,014,425
Construction	3	8	981,658	1,283,539	5,649,765	2,791,648	569,100	11,275,710
	4	9	2,521,856	2,408,909	4,176,378	2,063,622	1,178,850	12,349,615
Phase III	1	10	5,133,599	1,948,526	1,522,191	752,142	806,400	10,162,858
Operation	2	11	6,568,161	1,299,613	1,364,180	674,065	806,400	10,712,419
	3	12	6,568,161	1,405,044	1,364,180	674,065	806,400	10,817,850
	4	13	6,568,161	1,382,986	1,364,180	674,065	806,400	10,795,792
	5	14	6,568,161	1,382,986	1,364,180	674,065	806,400	10,795,792
	6	15	6,568,161	1,382,986	1,401,909	692,708	806,400	10,852,164
	7	16	6,568,161	1,420,892	1,429,578	706,380	806,400	10,931,411
	8	17	6,568,161	1,448,252	1,440,842	711,945	806,400	10,975,600
	9	18	6,568,161	1,459,838	1,440,842	711,945	806,400	10,987,186
	10	19	6,568,161	1,459,838	1,440,842	711,945	806,400	10,987,186
	11	20	6,568,161	1,459,838	1,463,370	723,077	806,400	11,020,846
	12	21	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	13	22	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	14	23	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	15	24	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	16	25	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	17	26	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	18	27	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	19	28	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	20	29	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	21	30	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	22	31	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
			146,796,759	37,092,936	46,628,714	23,040,068	19,773,300	273,331,777

Note: (a) The difference between the amount assessed and the amount collected reflects a one year lag between property tax assessment and collection. Taxes assessed in one year are collected and are part of the general county revenue the following year.

Table I - 5

PROJECTED TOTAL REVENUES AND EXPENDITURES BY YEAR FOR A 31 YEAR PROJECT

(1975 Dollars)

	Phase Year	Cumulative Years	Total Tax Revenues	Federal Lease Funds	Total Capital Expenditures	Total Highway Construction	Total Operations and Maintenance	Deficit/Excess Revenues
Phase I	1	1	–	–			–	
Mine	2	2	902,603	72,000,000			1,701,831	
Development	3	3	1,189,258				1,570,551	
	4	4	341,371				275,810	
	5	5	176,945				275,810	
Phase II	1	6	1,558,645	36,929,046(a)			3,106,173	
Plant	2	7	5,014,425				8,671,752	
Construction	3	8	11,275,710				16,212,563	
	4	9	12,349,615				14,887,712	
Phase III	1	10	10,162,858		36,119,231		7,169,853	
Operations	2	11	10,712,419			98,725,000(b)	7,057,843	
	3	12	10,817,850				7,057,843	
	4	13	10,795,792				7,057,843	
	5	14	10,795,792				7,057,843	
	6	15	10,852,164				7,248,139	
	7	16	10,931,411				7,391,464	
	8	17	10,975,600				7,449,276	
	9	18	10,987,186				7,449,276	
	10	19	10,987,186				7,449,276	
	11	20	11,020,846				7,563,694	
	12	21	11,044,191				7,563,694	
	13	22	11,044,191				7,563,694	
	14	23	11,044,191				7,563,694	
	15	24	11,044,191				7,563,694	
	16	25	11,044,191				7,563,694	
	17	26	11,044,191				7,563,694	
	18	27	11,044,191				7,563,694	
	19	28	11,044,191				7,563,694	
	20	29	11,044,191				7,563,694	
	21	30	11,044,191				7,563,694	
	22	31	11,044,191				7,563,694	
TOTAL REVENUE			273,331,777	108,929,046				382,260,823
TOTAL COSTS					36,119,231	98,725,000	209,855,186	- 344,699,417
TOTAL EXCESS REVENUE								37,561,406

Notes: (a) Interest on Federal Lease Funds
(b) One time estimated cost for all highway construction resulting from oil shale development

However, public revenues generated by the proposed project, while substantial in the long term, will be at least five to six years too late to meet the front end requirements considering both the four years necessary to complete construction and the lag before property improvements are reflected in actual tax revenues.

F. Mitigation Alternatives

The major options available to municipalities and the state for meeting the front end financing requirements are the following: (1) special impact funds such as the Lease monies; (2) loans and grants, such as federal categorical loans and grants or community bond issues; (3) special new tax solutions such as prepayment of property taxes or credits against a severance tax; or (4) various types of participation by the Venture in the provision of housing and services.

In assessing these alternative approaches, several criteria can be used. The costs of municipal expansion should be distributed as equitably as possible and current residents of the area should not be saddled with a major portion of the financial burden for new development. In addition, the financing method should be capable of producing sufficient revenue well in advance of development without burdensome carrying costs, and the revenue must be directly available to the communities who must make the decisions for use in a flexible fashion as needs arise.

The state's share of the Federal Lease monies is available for roads and schools as well as related planning, growth management and administrative expenses. While the fund is currently restricted to use for roads and schools, these represent a major portion of the costs of municipal expansion. It is also likely that the interest account will not be deemed subject to those restrictions. Although the Lease monies are limited and could be rapidly depleted by generous use for highways in the three county region, it seems reasonable that this source can be anticipated to make a significant contribution toward the costs associated with the tracts which supplied it. Hopefully, this can be done in a timely fashion in order to be able to accommodate the impacts when they occur.

Special federal categorical loans and grants, combined with community bond issues, can be anticipated to provide a significant portion of the cost of such facilities as water and sanitation systems. For example, Meeker recently passed a bond issue to cover the local match for school funds provided through the state's Lease monies and has successfully applied for federal loans for their proposed new water and sanitation system. Federal categorical loans and grants could be made more effective as a source of impact funds if they were coordinated through a single office, the application process were streamlined and the local match requirement were reduced or waived.

In addition to the Lease monies, federal loans and grants and community bond issues, the Venture is prepared to work with local, state and federal agencies to assure that adequate housing and services are made available. The Venture already has made a planning grant to Rio Blanco County. In addition, the Venture has initiated an extensive program of in-house community development planning while working closely with the local planning process.

Although no final decision has been made concerning the best method of participation, several options are open to the Venture in working with assisting local communities to respond to the needs of the new population. For example, the provision of land for residential development at cost could reduce the inflation of land speculation, lower the cost of housing, and reinforce county growth policy in terms of the location of community development.

The Venture supports a policy maximizing local participation in the labor force by facilitating the establishment of training programs at local educational institutions. This would reduce the size of the incoming new population. Contemplated efforts to facilitate the availability of mortgage credit would increase the availability of housing for the population associated with the proposed project. Some form of participation in the provision of temporary housing and services for the construction force and their phase out as the permanent population arrives also is under consideration.

G. Settlement Patterns: Community Development Options

Where the population may settle will be determined primarily by currently available or proposed highway access, amenities offered by the various communities, growth and zoning policies to encourage or discourage settlement, and efforts by the Venture to facilitate growth in one area or another. Generally it is assumed that a compromise will be made by new residents between commuting distance and the best available amenities, such as schools and commercial facilities. The availability of relatively inexpensive housing is a major consideration, of course, but that is assumed to be partly a function of which community develops first, which, in turn, is subject to planning.

In considering the most likely scenarios for community development, the Piceance Creek basin can be viewed as a rectangle with Rangely to the west and Meeker to the east along the road on the basin's northern edge. South of Meeker along the basin's eastern border lies Rifle, and southwest of Rifle along the southern border of the Piceance Creek Basin is Grand Valley and the proposed Battlement Mesa new town. Much further to the west lies Grand Junction, and further east of Rifle is Glenwood Springs.

Since Meeker and Rifle are almost equidistant from Tract C-b, both are likely sites for settlement. Grand Junction and Glenwood Springs offer the greater amenities of larger cities, but both involve considerable commuting time. In terms of convenience of location, a new town could be developed at the Rio Blanco Store, midway between Meeker and Rifle, or at the site of White River City.

In view of these considerations, the most likely development alternatives appear to be: (1) unplanned strip development along the road between Meeker and Rifle; (2) concentration of development in a new town at the Rio Blanco Store or White River City; (3) 50 percent of the population in Meeker and 50 percent in Rifle; or (4) a somewhat greater concentration of the population in Meeker or Rifle.

Strip development is unattractive, wasteful of agrigultural land and open space, 30 to 40 percent more expensive than concentrated development and prohibited by Rio Blanco County growth policy. The county not only seeks to discourage strip development, it also seeks to discourage new town development and to concentrate new growth within existing communities to the maximum extent possible.

The Town of Meeker has expressed a desire to capture roughly 50 percent of the population associated with the proposed facility. Equal development of Meeker and Rifle has the serious disadvantage that development in Garfield County associated specifically with Tract C-b would not have a supporting tax base in the same county. Since equitable resolution of this problem would involve governmental mechanisms for revenue transfer not currently available, it would seem more practical to focus development primarily in Meeker with supplemental development in Rifle. At best, development in Meeker could be expected to attract 60 to 70 percent of the new population with the rest settling outside city limits, in Rifle and elsewhere.

Table I-6 shows total comparative costs for different kinds of settlement patterns.

Table I - 6

TOTAL PER CAPITA ESTIMATED COSTS ASSOCIATED WITH THREE DEVELOPMENT PATTERNS

Type of Development	I. Low Density Sprawl(a) (no planning)	II. Managed Growth (Expansion of Existing Towns)	III. New Town
Municipal Utilities Municipal Streets and Roads, Water, Sewer, Solid Waste, Cables, Storm Drainage	2,590[1] 42% >II	1,830[2]	4,480[3] 2.45 x II
Public Schools	1,574	1,574	1,360
Vocational – Technical	542	542	542
College	199	199	199
Nursery	111	111	111
Other Human Services	572	572	860
Elderly Services	708	708	708
Growth Planning and Consultants	–	215	140
Sub-total	6,296 12% II	5,751	8,400 49% II
Residential Housing Costs	14,246 50% II	9,497	9,497
Sub-total	20,542 36% II	15,248	17,897 18% II
State and County Highways	2,246	2,246	2,246
Grand Total	22,788 30% II	17,494	20,143 15% II

Note: (a) The Real Estate Research Corporation's study, The Costs of Sprawl, describes six community development patterns including planned mix, combination mix with 50 percent PUD, 50 percent sprawl, sprawl mix, low density planned, low density sprawl and high density planned. Costs for municipal services in a sprawl situation are estimated to be 42% greater than in a combination mix with 50% PUD and 50% sprawl.

Sources: 1. Real Estate Research Corporation, 1974, pages 106-131.
2. Based on Table I-3.
3. C-b staff estimates.

CHAPTER II

EMPLOYMENT AND POPULATION BUILDUP

CHAPTER II EMPLOYMENT AND POPULATION BUILD UP

A. The Phases of Development

The projected overall life of the mine and plant is 31 years, including 9 years of development and construction. The proposed project will proceed in four phases: Phase I, Mine Development; Phase II, Plant Construction; Phase III, Plant Operations; and Phase IV, Post Operations (see Figure II-1).

Phase I, Engineering and Mine Development, which lasts for the first five years, involves construction of the staging area, sinking of the mine shaft, and pilot mining. Construction of the commercial plant, Phase II, begins in Year 6 and is scheduled to take four years. Operation of the completed facility, Phase III, begins in Year 10 and continues for 22± years. Phase IV, Post Operations, consists of revegetation of the remaining unrevegetated processed shale and general reclamation of the site.

B. Direct Employment: Manpower Requirements and Timing

1. Phase I: Mine Development

Phase I consists of two major activities: construction of the staging area and mine shaft during Years 2, 3 and 4, and pilot mining during Years 4 and 5 (see Figure II-2). Construction of the staging area begins immediately in Year 2, peaks toward the end of the second year and continues through Year 3 into Year 4. Shaft sinking, or construction of the mine shaft, also begins in Year 2, several months after the beginning of surface construction, and continues through Year 3 into Year 4. Early in Year 4, following completion of the staging area and mine shaft, pilot mining begins and continues through Year 5.

Figure II-3 and Table II-1 show the pattern of manpower build up and the estimated peak number of employees on the site during Phase I. The maximum total employment during Phase I occurs at the peak of construction activity, when an estimated total work force of 425 will be required in months 8 and 9, including the surface construction force, shaft sinkers and field staff. The total estimated employment during pilot mining, in Years 4 and 5, remains at approximately 59 employees throughout, including both pilot miners and the field staff.

At the peak of Phase I construction activity in month 8, following a gradual manpower build up over the first 7 months, a maximum work force of approximately 325 will be engaged in surface construction for the staging area. Shaft sinking will commence in month 7 and quickly reach peak employment of approximately 85 in month 9.

Once the shaft is completed, a mining crew of approximately 37 will be required for pilot mining through the end of Year 5 (see Table II-1). The pilot miners, unlike the shaft sinkers, are considered part of the

FIGURE II-1

PROPOSED DEVELOPMENT SCHEDULE

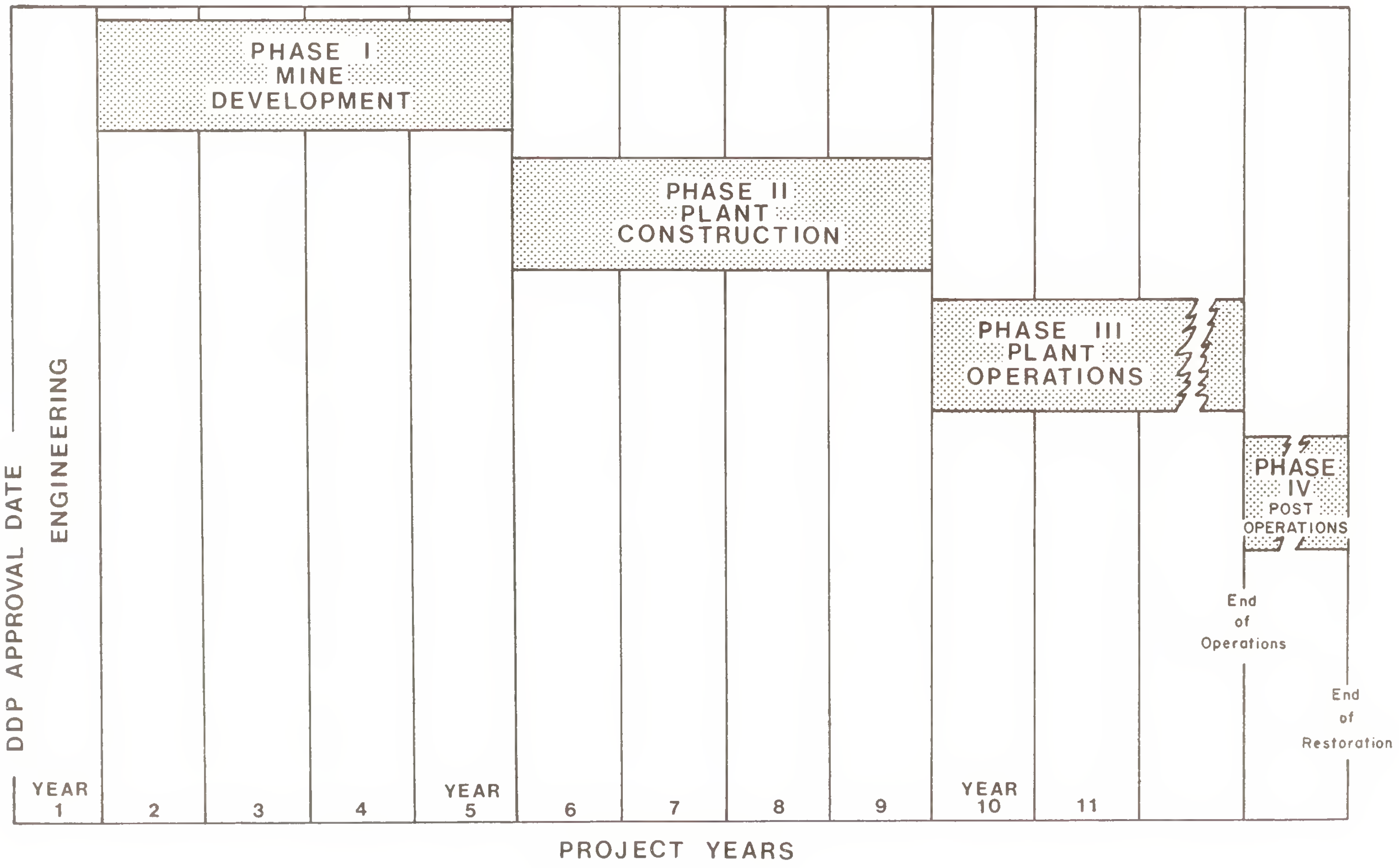
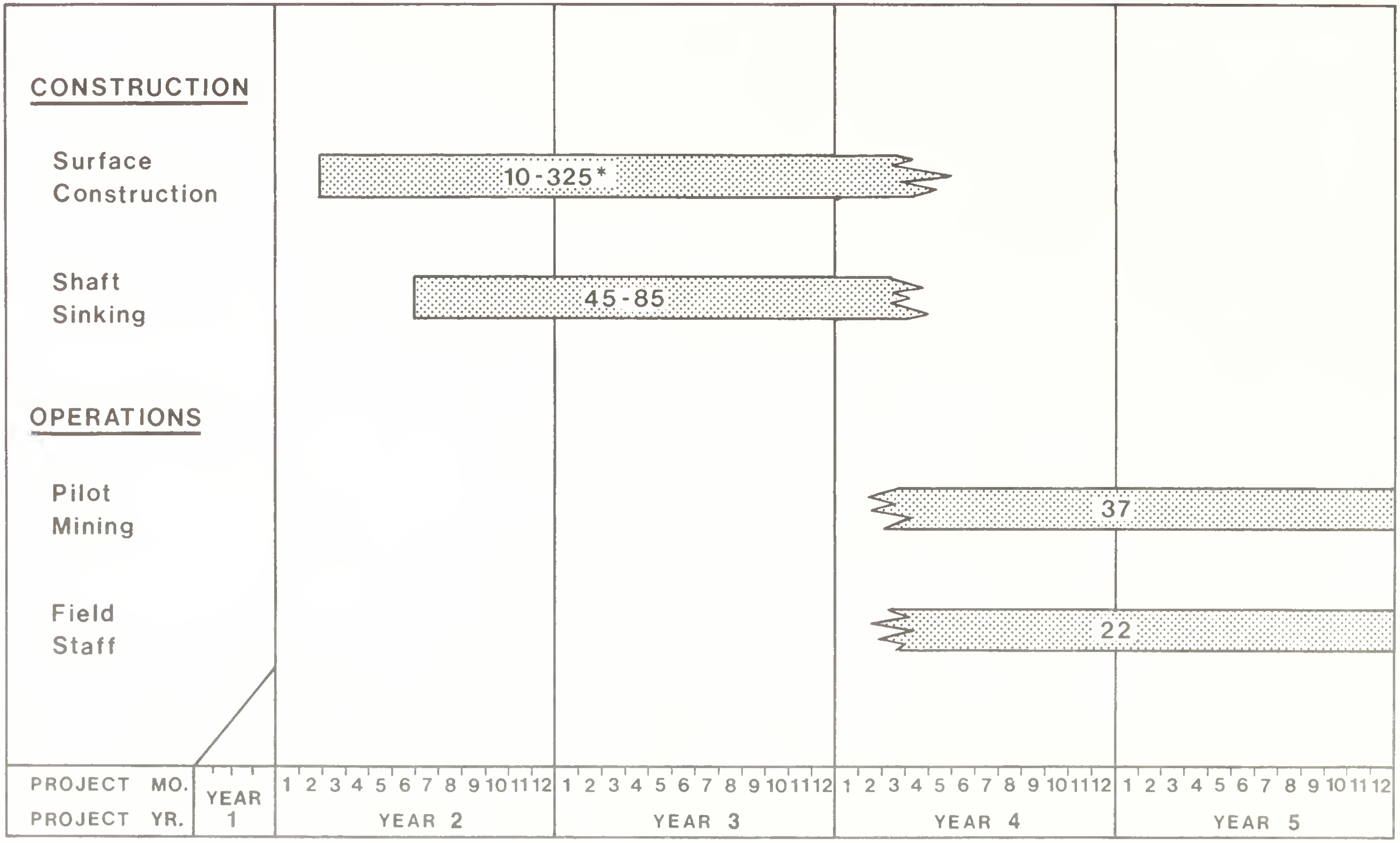


FIGURE II-2

PHASE I: DEVELOPMENT SCHEDULE



* NOTE: Numbers indicate the expected build-up of employees required for each activity.

FIGURE II-3

PHASE I: PATTERN OF MANPOWER BUILD-UP

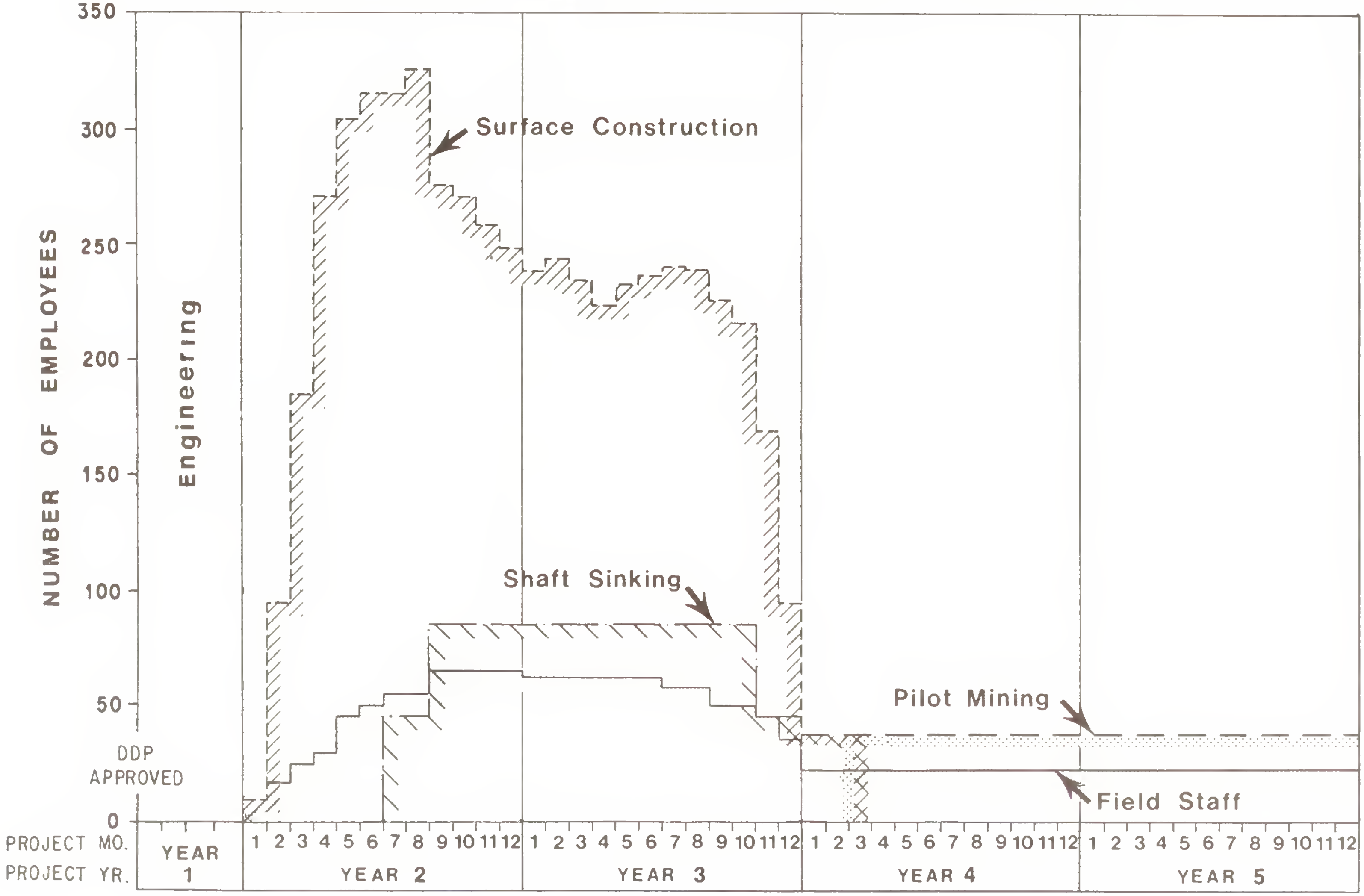


Table II - 1

PHASE I: MINE DEVELOPMENT
(Projected Employment Build-Up by Month)

			Construction		Operation	
Project Year	Month	Total Direct Employment	Surface Construction	Shaft Sinking	Pilot Mining	Field Staff
Year 2	1	20	10			10
	2	112	95			17
	3	209	184			25
	4	300	270			30
	5	349	304			45
	6	365	315			50
	7	415	315	45		55
	8	425	325	45		55
	9	425	275	85		65
	10	420	270	85		65
	11	408	258	85		65
	12	398	248	85		65
Year 3	1	385	238	85		62
	2	390	243	85		62
	3	381	234	85		62
	4	370	223	85		62
	5	379	232	85		62
	6	383	236	85		62
	7	382	239	85		58
	8	381	238	85		58
	9	360	225	85		50
	10	350	215	85		50
	11	258	168	45		45
	12	175	95	45		35
Year 4	1 thru 12	59	(a)		37	22
Year 5	1 thru 12	59			37	22

Notes: (a) Surface construction and shaft sinking may actually continue into year 4, however, no manpower or wage estimates have been made as the numbers of personnel are expected to be minimal.

permanent work force, since they will be trained for work in the commercial mines.

Throughout Phase I an operations field staff will supervise construction of the staging area and mine shaft, and the pilot mining. The field staff will reach a peak work force of 65 during the peak of activity in Year 2 and be reduced to a constant size of 22 during the pilot mining in Years 4 and 5.

2. Phase II: Plant Construction

Construction of the commercial plant, Phase II, begins in Year 6 and is scheduled for completion within four years (see Figure II-4). Figure II-5 and Table II-2 show the approximate pattern of manpower build up during Phase II and the estimated peak number of construction workers and other employees on site.

The maximum total employment during Phase II will be approximately 3,325, including the on tract and off tract construction force, supervisory personnel, miners and operations field and management. As in Phase I the peak work force coincides with the peak of construction activity.

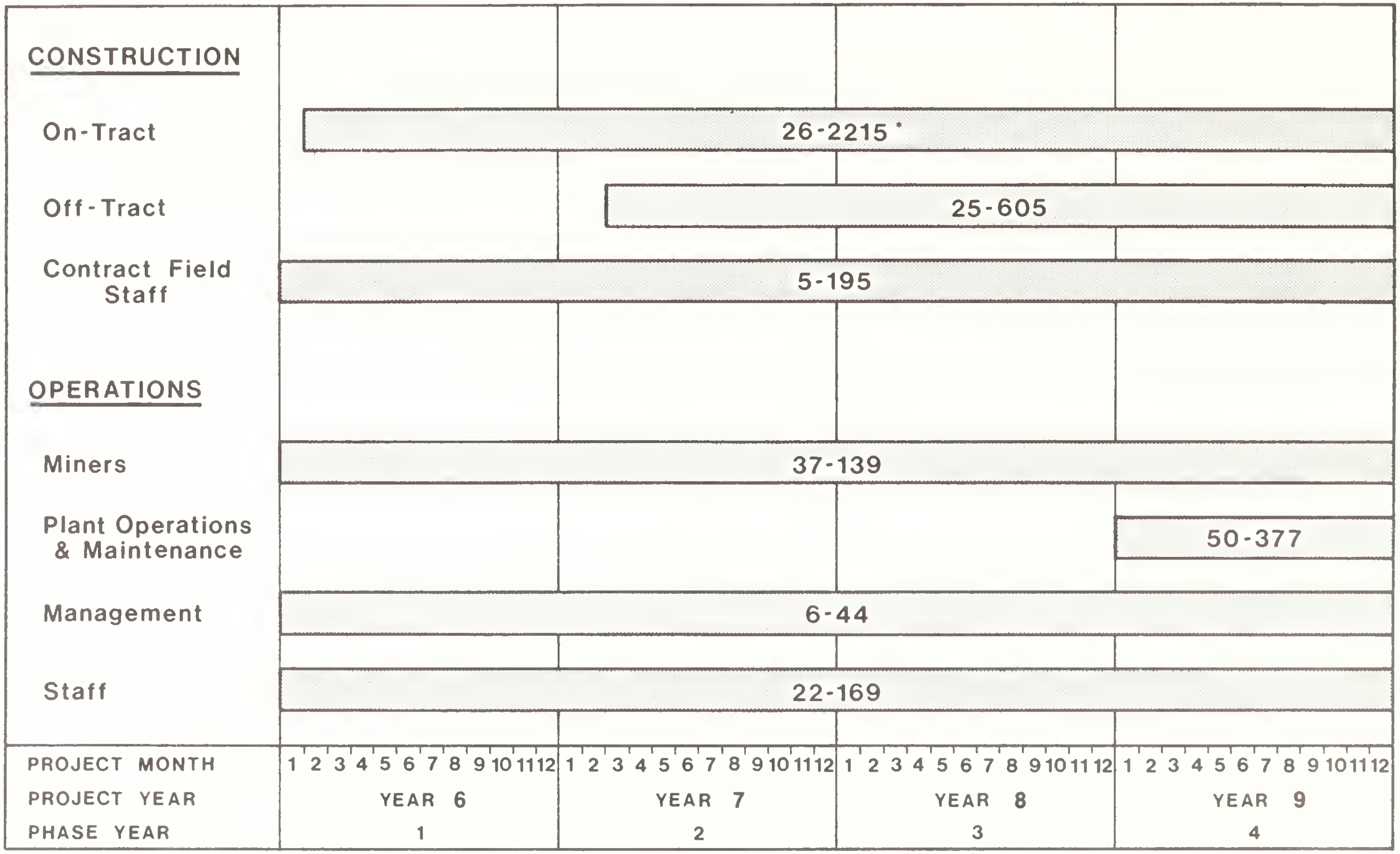
Plant construction on tract begins in the second month of Year 6 and reaches a peak work force of approximately 2,215 toward the end of Year 8 of the project, or the third year of plant construction. Off tract construction of staging facilities for the plant begins in the third month of Year 7 and peaks in Year 8 with a work force of approximately 605. The construction activities are supervised by the contractor's field staff, which numbers approximately 195 at the peak.

The number of miners will remain at 37 throughout Year 6, then gradually increase to a peak of 139 in Year 9. The operations staff will number 22 throughout Year 6, increasing to a peak of 169 in Years 8 and 9. During Phase II, the phase in of permanent on site management will begin and quickly reach a steady work force of 44 in month 6 of Year 6, continuing at that level throughout Year 9. In Year 9 the plant maintenance force also will be phased in, reaching a peak of 377 toward the end of the year (see Table II-2).

Total construction employment during Phase II, including on tract plant construction, off tract construction of the staging area and the field supervisory staff for construction, will reach a peak of 3,015 in Year 8 of the project, or the third year of plant construction. Nearly three-fourths of the total 3,015 peak construction force (2,215) will be engaged in on site plant construction; 605 will be involved in off tract construction of staging facilities and 195 in supervisory tasks. As a general rule of thumb, the size of the contractor's field staff is anticipated to be approximately seven percent of the construction force.

FIGURE II-4

PHASE II: DEVELOPMENT SCHEDULE



*NOTE: Numbers indicate the expected build-up of employees for each activity.

PHASE II: PATTERN OF MANPOWER BUILD-UP

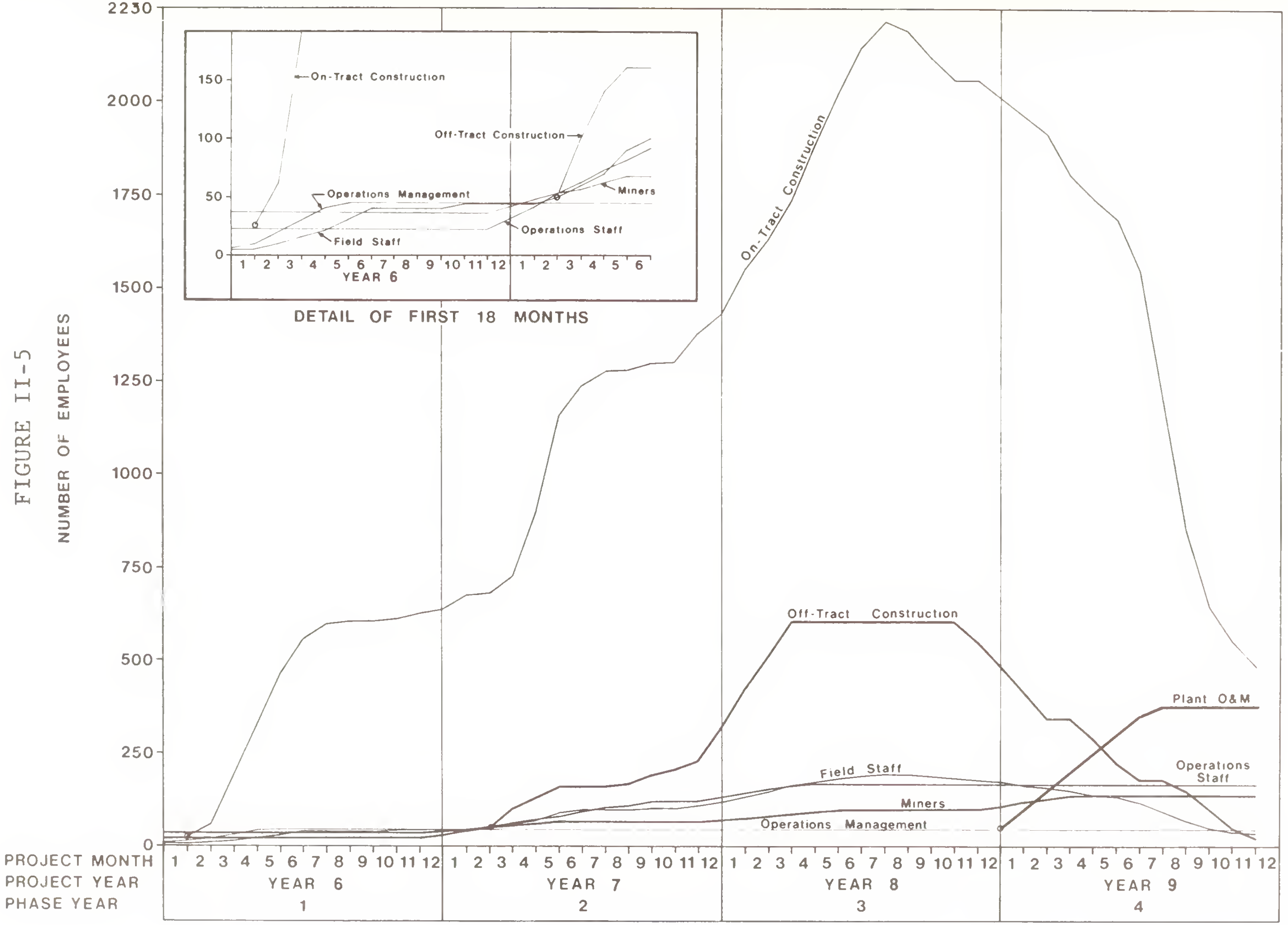


FIGURE II-5

Table II - 2

PHASE II: PLANT CONSTRUCTION
(Projected Employment Build-Up by Month)

				Construction			Operation			
Phase Year	Cumulative Year	Month	Total	On-Tract	Off-Tract	Contractor's Field Staff(a)	Miners	Plant Operators & Maintenance	Management	Staff
1	6	1	70			5	37		6	22
		2	100	26		5	37		10	22
		3	150	61		10	37		20	22
		4	300	196		15	37		30	22
		5	450	331		20	37		40	22
		6	600	467		30	37		44	22
		7	700	557		40	37		44	22
		8	740	597		40	37		44	22
		9	750	607		40	37		44	22
		10	750	607		40	37		44	22
		11	760	612		45	37		44	22
		12	775	627		45	37		44	22
2	7	1	800	637		45	42		44	32
		2	850	672		45	47		44	42
		3	925	677	50	50	52		44	52
		4	1050	727	100	60	57		44	62
		5	1275	897	130	70	62		44	72
		6	1600	1157	160	90	67		44	82
		7	1700	1237	160	100	67		44	92
		8	1750	1277	160	100	67		44	102
		9	1775	1282	170	100	67		44	112
		10	1825	1297	190	105	67		44	122
		11	1850	1302	210	105	67		44	122
		12	1950	1377	230	110	67		44	122

Notes: (a) Represents approximately 7% of Construction force.

Table II - 2 (continued)
PHASE II: PLANT CONSTRUCTION
(Projected Employment Build-Up by Month)

				Construction			Operation			
Phase Year	Cumulative Year	Month	Total	On-Tract	Off-Tract	Contractor's Field Staff[a]	Miners	Plant Operators & Maintenance	Management	Staff
3	8	1	2125	1432	325	120	72		44	132
		2	2375	1552	425	135	77		44	142
		3	2600	1662	510	150	82		44	152
		4	2800	1737	605	165	87		44	162
		5	2975	1890	605	175	92		44	169
		6	3125	2025	605	185	97		44	169
		7	3250	2145	605	190	97		44	169
		8	3325	2215	605	195	97		44	169
		9	3300	2190	605	195	97		44	169
		10	3225	2120	605	190	97		44	169
		11	3160	2060	605	185	97		44	169
		12	3100	2060	550	180	97		44	169
4	9	1	3040	2010	485	175	107	50	44	169
		2	2975	1965	415	165	117	100	44	169
		3	2910	1915	345	160	127	150	44	169
		4	2850	1805	345	150	137	200	44	169
		5	2775	1743	290	140	139	250	44	169
		6	2700	1688	225	135	139	300	44	169
		7	2550	1548	180	120	139	350	44	169
		8	2200	1196	180	95	139	377	44	169
		9	1800	851	150	70	139	377	44	169
		10	1525	646	100	50	139	377	44	169
		11	1375	556	50	40	139	377	44	169
		12	1275	486	25	35	139	377	44	169

Notes: (a) Represents approximately 7% of Construction force.

Total permanent operation employees, including miners, field staff, management and plant maintenance personnel, will reach a peak of 729 at the end of Year 9. The operations staff represents the largest employment category, followed by miners, until Year 9, when plant maintenance personnel will become the largest category, with nearly twice as many personnel as either miners or operations staff.

3. Phase III: Plant Operation

Phase III, Plant Operation, commences in Year 10 and continues through Year 31. Construction activity will be completed and the plant brought to full operation during the first few months of Year 10. The total permanent operation force will be brought up to the level of 1,093 by the end of Year 10. Small increases in the level of manpower are anticipated at several points during the operations period, resulting in an eventual maximum of approximately 1,172 employees (see Table II-3).

The total permanent work force of 1,172 will consist of approximately 446 miners, 437 operations personnel for the plant, including maintenance employees, 169 operations staff and 77 management personnel (see Table II-3). Overall peak employment for Phases I, II and III then will be 425; 3,325; and 1,172, respectively.

C. Estimated Salary Ranges

The estimated average annual salary ranges for the proposed project in 1975 dollars are: $16,600 to $23,700 for the construction force (see Tables II-4 and II-5); $14,100 to $14,700 for the mining and plant operations personnel; and $18,000 to $20,700 for field management personnel (see Table II-5).

The total estimated cumulative payroll for all employees in Phase I will be $16.4 million with a peak annual payroll of $7.4 million in Year 3. The total payroll for Phase II will be $159.3 million, with a peak annual payroll of $66.5 million in Year 8 of the project, at the height of the construction activity. During the operation phase, Phase III, the total payroll for the 22 year operation period will be approximately $372.9 million with an annual estimated average of $16.9 million. The estimated total cumulative wages for the entire 31 year life of the proposed project will be approximately $548.6 million (see Table II-6).

D. Service Employment

1. Basic to Service Multiplier

The employment directly generated by the project will require expansion of secondary employment in the service sectors, such as retail sales, banking, entertainment and health services, to meet the needs of the new population. The extent of the service employment induced by the proposed project relative to the direct employment can be projected on the basis of the basic to service employment multiplier.

Table II - 3

PHASE III: PLANT OPERATIONS

(Projected Employment Build-Up by Month)

				Construction			Operation			
Phase Year	Cumulative Year	Month	Total	On-Tract	Off-Tract	Contractor's Field Staff(a)	Miners	Plant Operators & Maintenance	Management	Staff
1	10	1	1250	421		30	189	397	44	169
		2	1230	346		25	239	407	44	169
		3	1200	251		20	289	427	44	169
		4	1180	196		15	339	417	44	169
		5	1160	121		10	389	427	44	169
		6	1140	49		5	439	434	44	169
		7	1120	25		2	446	434	44	169
		8	1093				446	434	44	169
		9	1093				446	434	44	169
		10	1093				446	434	44	169
		11	1093				446	434	44	169
		12	1093				446	434	44	169
2	11	12	1093				446	434	44	169
3	12	12	1123				476	434	44	169
7	16	12	1145				498	434	44	169
8	17	12	1154				506	435	44	169
11	20	12	1172				522	437	44	169
22	31	12	1172				522	437	44	169

Notes: (a) Represents approximately 7% of construction force.

Table II - 4

ESTIMATED CONSTRUCTION PERSONNEL WAGES FOR PHASE I
(Journeyman Class in Rio Blanco County, Colorado)
(1975 Dollars)

Crafts	Hourly Wage(b) $	Distance Per Diem $	Hourly Equivalent 5D – 8 hr. $	Hourly Equivalent 6D – 9 hr. $	Man Hour Distribution %	Crafts Costs Per Man Hour 5D – 8 hr. $	Crafts Costs Per Man Hour 6D – 9 hr. $
Boilermaker	8.90	11.00	10.28	12.43	.01	.1028	.1243
Block Masons	7.85	15.00	9.73	11.55	.004	.0389	.0462
Carpenters	8.65	–	8.65	10.89	.11	.9515	1.1979
Cement Finishers	10.11	10.00	11.36	13.37	.02	.2272	.2674
Electricians	9.80	15.00	11.68	14.01	.09	1.0512	1.2609
Iron Workers	9.20	15.00	11.08	13.25	.10	1.1080	1.3250
Laborers	5.50	–	5.50	6.67	.23	1.2650	1.5341
Millwrights	9.13	16.40	11.18	13.32	.04	.4472	.5328
Operating Engineers(a)	7.50	4.00	8.00	9.09	.22	1.7600	1.9998
Painters	9.60	12.00	11.10	13.42	.03	.3330	.4026
Pipe Fitters	9.50	14.00	11.25	13.52	.10	1.1250	1.3520
Teamsters(b)	7.25	3.00	7.63	9.13	.06	.4578	.5478
Weighted Hourly Average(c)			8.87	10.59			

NOTES:

(a) Overtime: double-time on weekends and holidays; time and a half on weekdays. All other classifications calculated at double-time rates for overtime.
(b) Rates in effect June 2, 1975.
(c) Weighted accordingly with the man-hour distribution.

SOURCE:

C-b Staff Estimates, 1975, based on information obtained from local union offices.

Table II-5
AVERAGE WAGE AND SALARY LEVELS FOR CONSTRUCTION WORKERS AND OPERATIONS EMPLOYEES
(1975 Dollars)

Phase	Category of Personnel	Monthly Wage	Annual Salary
Phase I:	Construction Workers[a]	1,978.00	23,736.00
	Field Staff[b]	1,500.00	18,000.00
	Shaft Sinkers[c]	1,386.00	16,632.00
	Pilot Miners[d]	1,226.00	14,712.00
Phase II:	Construction On-Tract	1,978.00	23,736.00
	Construction Off-Tract	1,978.00	23,736.00
	Contractor's Field Staff	1,500.00	18,000.00
Phase III:	Operating Field Management[e]	1,725.00	20,700.00
	Operating Field Staff[e]	1,183.00	14,196.00
	Miners	1,233.00	14,796.00
	Plant Operators & Maintenance Personnel	1,179.00	14,148.00

NOTES:

(a) See Table II-4 for craft rates, effective June, 1975. It is assumed that the amount of overtime will vary with the weather conditions which create peak and slack construction periods, with wage competition from other construction projects and with the outcome of union wage negotiations. The annual wage represents the average of 1 man working full time (40 hours per week, 50 weeks per year at $8.87 per hour) and 1 man working at overtime rates (54 hours per week, 52 weeks per year at $10.59 per hour).

(b) Assumes an average of the salaries of employees (construction supervision, mid-management, technical and clerical employees) during Phase I, Mine Development.

(c) Shaft sinkers are considered non-union construction and mining personnel.

(d) Wage rates for 1975 for six grades of coal mining job classifications (union and non-union miners) for the Western States Region were obtained from United Mine Workers Union and non-union sources. It is assumed that oil shale miners will earn similar wages. Seven job classification levels have been developed for both oil shale miners and plant operations and maintenance personnel. If existing union and non-union rates are assumed for these seven grades, weighted averages of $7.63 per hour and $6.83 per hour, respectively, are obtained. Because of the current uncertainty regarding the union or non-union affiliation of the labor force, an average of the two hourly rates was used to determine monthly wages and annual salaries based on the rate of 2,000 working hours per year.

(e) C-b Staff Estimates were made for Management and Staff employees.

Table II - 6

ESTIMATED TOTAL WAGES FOR C-b TRACT DIRECT EMPLOYMENT BY YEAR (1975 DOLLARS)

Phase	Phase Year	Cumulative Years	Total Wages for Year	Cumulative Total
Phase I	1	1	–	–
Mine	2	2	$ 7,091,362.00	$ 7,091,362.00
Development	3	3	7,419,948.00	14,511,310.00
	4	4	940,344.00	15,451,654.00
	5	5	940,344.00	16,391,998.00
Phase II	1	6	11,349,278.00	27,741,276.00
Plant	2	7	32,367,041.00	60,108,317.00
Construction	3	8	66,467,821.00	126,576,138.00
	4	9	49,133,861.00	175,709,999.00
Phase III	1	10	17,908,133.00	193,618,132.00
Operation	2	11	16,049,172.00	209,667,304.00
	3	12	16,049,172.00	225,716,476.00
	4	13	16,049,172.00	241,765,648.00
	5	14	16,049,172.00	257,814,820.00
	6	15	16,493,052.00	274,307,872.00
	7	16	16,818,564.00	291,126,436.00
	8	17	16,951,080.00	308,077,516.00
	9	18	16,951,080.00	325,028,596.00
	10	19	16,951,080.00	341,979,676.00
	11	20	17,216,112.00	359,195,788.00
	12	21	17,216,112.00	376,411,900.00
	13	22	17,216,112.00	393,628,012.00
	14	23	17,216,112.00	410,844,124.00
	15	24	17,216,112.00	428,060,236.00
	16	25	17,216,112.00	445,276,348.00
	17	26	17,216,112.00	462,492,460.00
	18	27	17,216,112.00	479,708,572.00
	19	28	17,216,112.00	496,924,684.00
	20	29	17,216,112.00	514,140,796.00
	21	30	17,216,112.00	531,356,908.00
	22	31	17,216,112.00	548,573,020.00

Source: Based on Tables II-2 through II-5.

Basic employment is that which brings new money into the local economy, while service employment is supported by the circulation of money within the local economy. The more complex the economy, or the less dependent it is on the import of services, the larger the basic to service employment ratio or "multiplier". For example, in a highly develop~~p~~ed, complex economy such as Los Angeles there are five service jobs for every one basic job, while in the case of some small mining towns in Colorado the multiplier is approximately .5.

The rapid growth associated with the introduction of a major new industry in a rural economy results in a higher basic to service multiplier as the economy develops. The size of the multiplier appropriate for projecting the service employment induced by the proposed project varies according to three major factors: (1) the size of the current baseline multiplier for the area; (2) the rate and pattern of change in the multiplier as the economy develops; and (3) the ultimate size of the multiplier after the economy has returned to stability, once the plant is in operation.

2. Current Multiplier for the Area

The size of the current multiplier in the impact area can be determined empirically. Recent studies show that the estimated average basic to local service employment multipliers for the local economies of Garfield, Mesa and Rio Blanco counties for 1970 were 1.47, 1.26 and 1.93 respectively (see Table II-7).

3. Pattern of Change in the Multiplier

The rate and pattern of change in the multiplier during the period of population growth is more difficult to determine, since there is little empirical data available on how rapidly the multiplier increases over time in boom situations. Fluctuations in the multiplier from the baseline level will be determined by such factors as: the perceived permanence of the new basic employment; the rapidity of the initial population build up; the extent of publicity and lead time preceding the development; the elasticity of existing services; the wage scales of the incoming basic employees; the number of new basic employees relative to the overall local basic employment; and the size of the new population relative to the minimum population base required for the development of various services.

During Phase I, Mine Development, and Phase II, Plant Construction, most of the new basic employment directly related to the project is temporary construction employment. To the extent that the new basic employment is viewed as temporary, new businesses and service personnel will not be induced to move into the area. In addition, the more rapid the growth, the more likely it is that there will be a lag between the build up of basic employment and the development of necessary services. While the relatively extensive publicity and lead time preceding oil shale development might tend to attract service workers into the area, those factors should be offset during Phases I and II by the perceived

Table II - 7

BASIC TO LOCAL SERVICE MULTIPLIERS BY INDUSTRY IN GARFIELD, MESA AND RIO BLANCO COUNTIES AND THE REGION

Industries	Garfield	Mesa	Rio Blanco	Three County Region
Agriculture	1.1	1.6	1.2	1.4
Mining	1.9	2.1	1.3	2.0
Construction	1.5	2.2	1.0	1.9
Manufacturing	1.0	1.5	1.1	1.3
Transportation and Communication	1.2	1.9	1.2	1.6
Trade	.8	1.2	.7	1.0
Services	.8	1.4	.6	1.1
Health Services	.9	1.4	.8	1.2
Education	1.0	1.6	1.0	1.3
Welfare and Misc. Professions	1.3	2.1	1.1	1.8
Public Administration	.9	1.6	.8	1.3
Average Multipliers for 1970	1.47	1.93	1.26	1.76

Source: Gilmore, 1973, Page 4.

temporary nature of the construction employment.

The higher the wage scales of the basic jobs, the greater the number of service jobs which can be supported for each basic job, and the higher the multiplier (see Table II-7). The wage scales of the construction and operations jobs associated with the project will be higher than the average wage scales in the area. In addition, the number of new basic jobs will be significant relative to the total number of current basic jobs in the area. Both these factors suggest that the ultimate multiplier will be slightly higher than the one currently applicable in the area.

In summary, the temporary nature of the construction employment and the relatively rapid population growth, therefore, suggest an initial lag before services develop. Thus, an initial multiplier lower than the current multiplier for the area should be anticipated during Phases I and II. After the initial lag it is anticipated that the multiplier will gradually increase to a final level higher than the original multiplier for the area, as a result of the higher wages, permanence of the project and greater complexity of the economy, once the plant is operational in Phase III.

4. Size of the Final Multiplier in Phase III

How large should the final multiplier be? On the basis of other available studies of energy development and assumptions about the various factors involved, as described, an initial decrease followed by a gradual increase in the size of the multiplier was projected for Phases I and II of the proposed project, as well as a final multiplier for Phase III (see Table II-8).

E. Total Induced Population

1. Average Family Size: Basic Employees

It is assumed that 60 percent of the construction force will be married and will bring their families. The remaining 40 percent are assumed to be single, or married and unaccompanied by a family. The average family size for married construction workers was found to be 3.5 in a 1974 study of the Sweetwater, Wyoming boom town. The Sweetwater study reported also that a higher percentage than might be anticipated brought their families in spite of the severe shortage of housing and services.

The average family size anticipated for the construction force required for the development of Tract C-b is assumed to be the same as that for Sweetwater, since the construction population is anticipated to be roughly comparable. Since less services and housing were available in Sweetwater to attract families, it is reasonable to assume that 60 percent is a conservative estimate of the percentage of workers anticipated to bring their families. This is especially so considering that, in the case of the proposed project, planning is being carried out to encourage employees to move their families to the area in order to create a more stable community.

Table II - 8

PROJECTED EMPLOYMENT AND POPULATION BUILD-UP FOR THE TRACT C-b SHALE OIL FACILITY[(a)]

Development Stages	Year	Cumulative Years	Total Construction Force	Total Operation Personnel	Total Basic C-b Employment	Total Basic C-b Population	Basic to Service Employment Multiplier	Total Induced Service Employment	Total Induced Service Population	Total Employment	Total Population
Phase I	1	1	–	–	–	–	–	–	–	–	–
Mine	2	2	370	55	425	1,097	.5	212	316	637	1,413
Development	3	3	328	62	390	1,014	.5	195	291	585	1,304
	4	4	–	59	59	184	.5	30	45	89	229
	5	5	–	59	59	184	.5	30	45	89	229
Phase II	1	6	672	103	775	2,002	.5	387	577	1,162	2,579
Plant	2	7	1,717	233	1,950	5,021	.75	1,463	2,179	3,413	7,200
Construction	3	8	3,015	310	3,325	8,506	1.0	3,325	4,954	6,650	13,461
	4	9	2,670	370	3,040	7,831	1.0	3,040	4,530	6,080	12,361
Phase III	1	10	451	799	1,250	3,624	1.25	1,563	2,328	2,813	5,953
Operation	2	11	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	3	12	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	4	13	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	5	14	0	1,093	1,093	3,416	1.50	1,640	2,444	2,733	5,860
	6	15	0	1,123	1,123	3,507	1.50	1,684	2,511	2,807	6,018
	7	16	0	1,145	1,145	3,578	1.50	1,718	2,559	2,863	6,137
	8	17	0	1,154	1,154	3,606	1.50	1,731	2,579	2,885	6,185
	11	20	0	1,172	1,172	3,662	1.50	1,758	2,618	2,930	6,280
	22	31	0	1,172	1,172	3,662	1.50	1,758	2,618	2,930	6,280

Note: (a) Manpower estimates represent the 1st peak month within each year if 2 months have identical manpower requirements.

It is anticipated that 85 percent of the permanent operations employees will be married and 15 percent single. An average family size of 3.5 is assumed for the married operations employees. Figure II-6 outlines the formulas used to calculate basic employee population.

2. Average Family Size: Induced Service Employees

It is assumed that the service population will resemble the permanent employee population, with 85 percent married and an average family size of 3.5. Only 40 percent of the service employees, however, are considered heads of households. Of the remaining 60 percent, 15 percent are considered single and the rest spouses or family members of basic employees or spouses of service employees who are heads of households. (see Table II-9)

3. Summary

As shown in Table II-8 the total direct population (construction employees, operations employees and their families) is estimated to range from 184 to 1,097 in Phase I; 2,002 to 8,506 in Phase II; and 3,416 to 3,662 persons in Phase III. The total indirect population (service workers and their families) will range from 45 to 316 in Phase I; 577 to 4,954 in Phase II; and 2,328 to 2,618 in Phase III. The total direct and indirect population is expected to reach a maximum of 13,461 persons in Phase II, Year 8, and level off to 6,280 persons from Year 20 to Year 31 of the operations phase.

TABLE II - 9

POPULATION PROJECTION FORMULA

Construction Population

(# of workers) (60% married) = (a)Total number of construction families

(# of families) (3.5 family size multiplier) + (# of workers) (40% single) = Total Construction Population

Operations Population

(# of workers) (85% married) = (b)Total number of operations families

(# of families) (3.5 family size multiplier) + (# of workers) (15% single) = Total Operations Population

Service Population

(# of workers) (40% married) = (c)Total number of service families

(# of families) (3.5 family size multiplier) + (# of workers) (9% single) = Total Service Population

(Total Construction Population) + (Total Operations Population) + (Total Service Population) = Total Induced Population

Notes: (a) The projection used in this formula assumes that 60% of construction workers will be married with families and 40% will be single.
(b) It is also assumed here that 85% of the operations workers will be married with families and 15% will be single.
(c) The service population is expected to consist of 40% married, heads-of-households, with families and 9% single persons with 51% of the population being spouses or other family members of families already located in the area. The heads-of-households of these latter families may be construction, operations or other service workers.

Source: The family size multipliers used here are based on Gilmore, 1975, pages 9, 81.

3

CHAPTER III

POPULATION DISTRIBUTION: PROJECTED SETTLEMENT PATTERNS

CHAPTER III POPULATION DISTRIBUTION: PROJECTED SETTLEMENT PATTERNS

A. Introduction

This chapter describes the location of the Tract in relation to nearby existing communities and access roads and discusses the possible patterns of residential development to accommodate the incoming population. The chapter reviews major factors which will affect the location of community development, analyzes the comparative advantages and disadvantages of alternative growth scenarios, and presents population projections for existing communities for each settlement scenario.

B. Location of the Tract

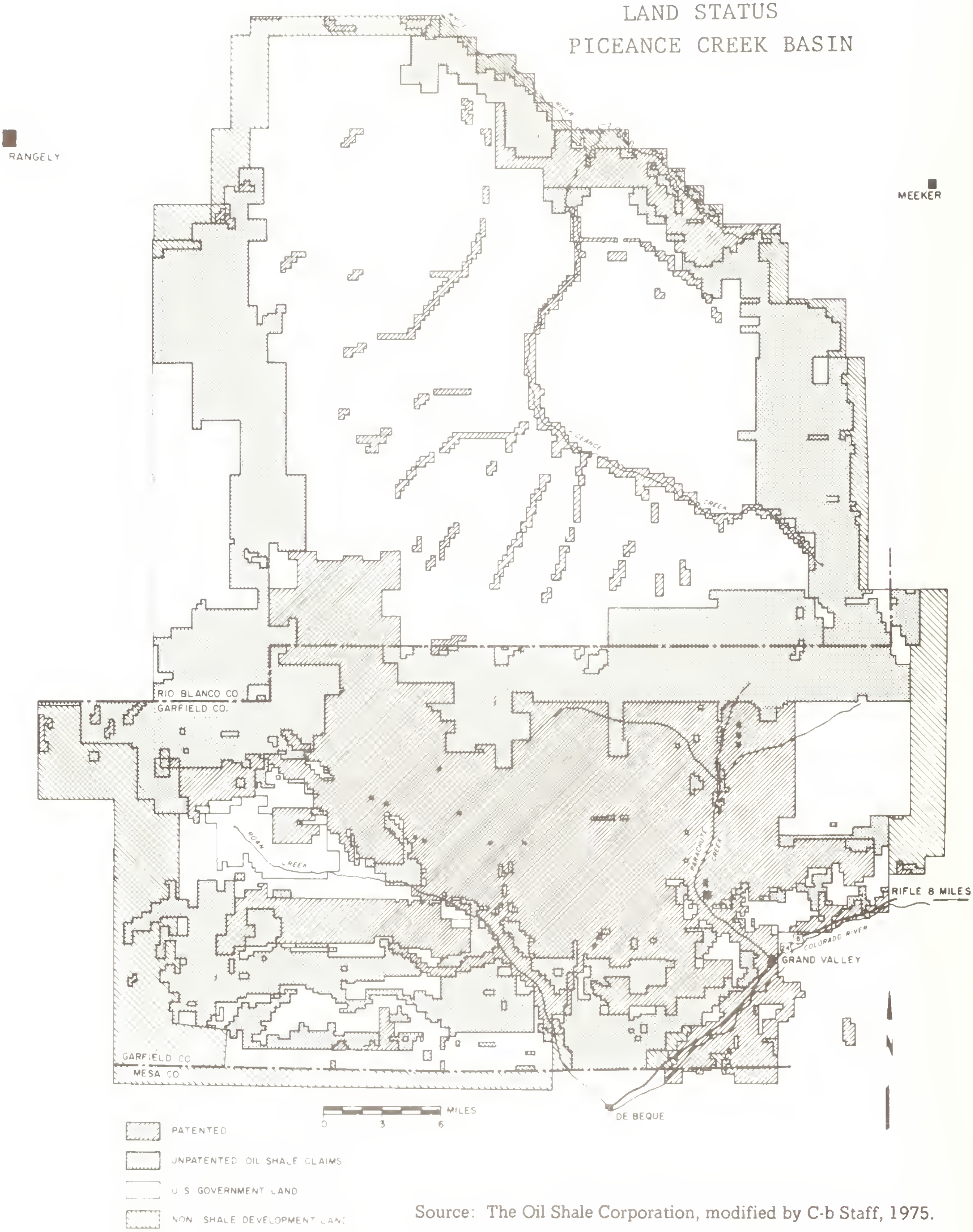
Construction and operation of the project will have its major population impact in Rio Blanco and Garfield Counties, specifically on the towns of Meeker and Rifle. The Tract is located in the central portion of the Piceance Creek Basin, and the south central portion of Rio Blanco County. Settlement in the Piceance Creek Basin itself is limited to a few ranches. While it is possible that residential settlement could increase slightly along the Parachute Creek drainage to the south where several privately-owned oil shale projects such as Colony Development Operation and Union Oil's site are located, it is probable that residential development within the Piceance Creek basin will remain minimal.

Approximately 70 percent of the land within the basin is owned by the federal government and 20 percent by large and small corporate owners interested in eventual mineral development (see Figure III-1). In addition, access to the basin is limited to a few roads providing access to oil shale projects. In the case of the proposed action on Tract C-b, no residential settlement is envisioned within the basin. Rio Blanco officials have said that they plan to discourage settlement within the Piceance Creek Basin. The two nearest communities outside the basin are Meeker in Rio Blanco County and Rifle in Garfield County. Meeker is located approximately 42 miles northeast of the project via the Piceance Creek Road and Route 13 North, while Rifle lies approximately 39 miles southeast of the project along the Piceance Creek Road and then south on State Highway 13.

Highway access is a major determinant of the pattern of residential development. Development traditionally concentrates in the most easily accessible communities and along primary roads. The Piceance Creek Basin is bordered on the north by State Highway 64 between Rangely and Meeker, on the east by State Highway 13 between Meeker and Rifle and along the south by Interstate Highway 70 which runs west from Grand Junction through Clifton, Palisade, DeBeque, Grand Valley, Rifle, Silt, New Castle and Glenwood Springs. The main access road to the Tract is the Piceance Creek Road which runs southeast intersecting State Highway

FIGURE III-1

LAND STATUS
PICEANCE CREEK BASIN



Source: The Oil Shale Corporation, modified by C-b Staff, 1975.

64 between Meeker and Rifle making both towns almost equally accessible to the Tract (see Figure III-2).

While development generally can be expected to spring up along major access routes in more densely populated areas, growth in Rio Blanco and Garfield Counties is primarily concentrated in small communities with little strip development along the highways. There has been an increasing awareness at the county level in the last few years of the problems related to strip development, and of the desirability for concentrated growth. Strip development has not occurred in this area primarily because of its rural nature and limited growth. In the more urbanized areas, such as around Glenwood Springs, the beginnings of suburban sprawl are apparent along the main highway. Such sprawl would be a natural pattern of settlement if the many small communities along Interstate Highway 70 were to expand rapidly with no attempt to discourage scattered growth.

C. Factors Affecting the Pattern of Growth

In addition to the proximity and good highway access to existing communities, the location of new residential development will be heavily influenced by the timely availability and cost of housing and municipal services in those communities. Given availability of housing at reasonable costs in several locations, the average employee of the project can be expected to attempt to maximize the quality and variety of municipal and commercial services while minimizing travel time. Since travel time in northwest Colorado is as much a function of the condition of the roads and terrain as the distance, the gravity model for predicting settlement patterns is not as useful here as it is in other cases.

It is assumed that one hour of commuting time is generally a maximum for most residents. Rifle and Meeker are comparable in terms of distance from the Tract. Although the municipal services and commercial facilities available in a community the size of Grand Junction might provide a significant attraction, the distance from the Tract makes it unlikely that more than a few employees will settle there. Glenwood Springs, the other major town, also is too far from the Tract to be a likely location for many employees. Since Rangely is a substantial distance beyond Meeker, is about the same size as Meeker, and offers no major advantages over Meeker in the range of services or housing available, it seems unlikely that a significant number of employees will settle

Meeker and Rifle, which are both relatively near the Tract and are of similar size, therefore appear to be the most likely sites for settlement and of equal attraction to new residents. The major distinction between the two towns is the difference in the character and style of the communities. In addition, Meeker is relatively more rural, while Rifle's proximity to Glenwood Springs and Grand Junction might appeal to those seeking a more urban environment and a wider variety of services.

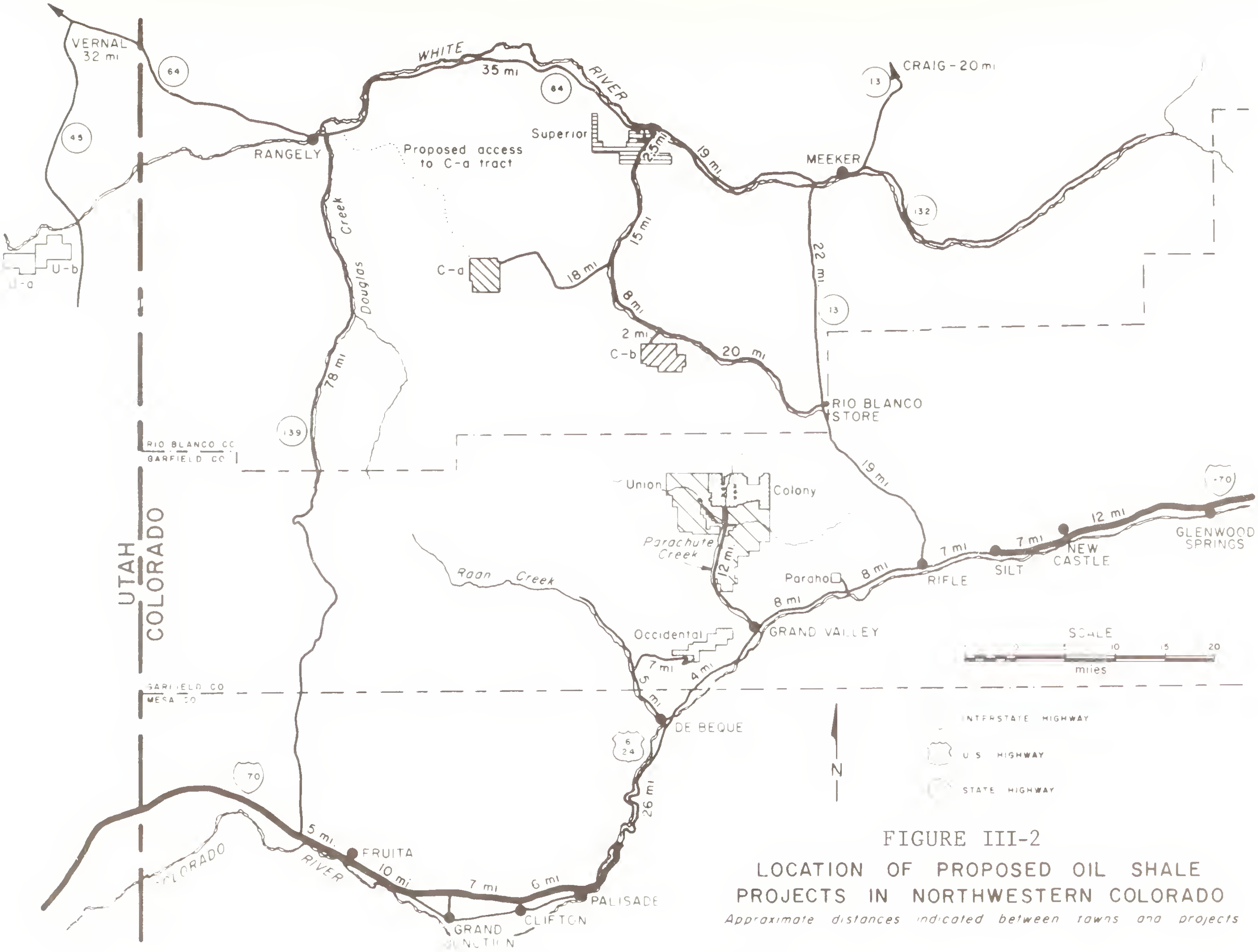


FIGURE III-2

LOCATION OF PROPOSED OIL SHALE PROJECTS IN NORTHWESTERN COLORADO

Approximate distances indicated between towns and projects

Policies affecting the early availability of housing and services at acceptable cost are as important in determining the pattern of growth as the trade-off between travel time and the range and quality of amenities. County growth policies which strongly encourage growth in one area and discourage it in another will have a major impact on the initial patterns of development. If early investors in development support the county in its growth policies by investing in those areas considered suitable for residential expansion and the county facilitiates that process by providing service facilities, sound long-term growth patterns could be determined from the start.

D. Alternative Development Scenarios

What then are the options for community development? Four main scenarios can be readily identified. The first is the most likely pattern of growth in the case of laissez faire development without a county growth policy. In the absence of planning, growth would be scattered among the nearest communities and along the major highways. The second alternative is planned growth equally shared between Rifle and Meeker, while the third option is to attempt to concentrate development primarily in one community or the other. The fourth possibility is the development of a new community either at the Rio Blanco Store or at White River City.

1. Scenario 1: Scatter Development

Costs for laissez faire, scattered development or sprawl are estimated to be from 30 to 50 percent higher than for well planned, concentrated development. In addition to higher long range costs, the higher consumption of agricultural land and open space for residential development, increased traffic and pollution along the road between Meeker and Rifle and deterioration of the scenic value of the area, makes scattered growth the least desirable alternative.

The Costs of Sprawl, a report commissioned by the Council on Environmental Quality, provides some idea of the capital cost and operating savings which result from planned, concentrated development. A planned community can reduce capital costs by 4 percent and operating and maintenance costs by 5 to 6 percent at all densities. The advantages of planned development for the environment include 20 to 30 percent less air pollution from automobiles, conservation of open space, preservation of significant wildlife and vegetation habitats, minimized noise impacts and minimized soil disturbance.

Higher density developments provide significant cost advantages. However, planning this high density development is clearly the most efficient means to reduce costs. A comparison of high-density planned development with low density sprawl development shows the total capital requirement of high-density planned development to be only 56 percent of that necessary for sprawl development. Operating and maintenance costs are estimated to be 11 percent less for high-density planned development than for sprawl development.

Higher density planned development is also more environmentally advantageous than sprawl, considering that air pollution from automobiles may be reduced by 50 percent, natural gas use may be reduced by 40 percent, sediment may be reduced by 30 percent and storm water runoff may be reduced by 20 percent. Higher densities may, however, reduce privacy somewhat, increase noise pollution and increase the concentration of pollution from the residential unit. The disadvantages of density can be mitigated significantly by effective design and planning.

2. Scenario 2: 50 percent Concentration of the Population in Meeker and 50 percent in Rifle

Concentration of the population primarily within the existing communities of Rifle and Meeker has the advantage of conforming to the explicit wishes of elected officials in Rio Blanco and Garfield Counties as well as preserving agricultural land and existing open space. Traffic along the Meeker-Rifle highway could be minimized through the possible use of a public transportation system for the trip to work.

Rio Blanco officials have made it clear that they wish growth to be centered in existing communities to contribute to the economic health of the communities and to preserve the rural environment surrounding the Tract. They have publicly stated their intention to discourage sprawl for environmental land use and municipal cost considerations and to discourage new communities in order to maximize the contribution of the new population to the economic health of existing communities.

In order to preserve the existing character of Meeker, a sketch plan has been proposed which also discourages the development of new towns in town. The plan suggests that new residential development should be located in areas specifically zoned for residential expansion, while commercial services should be concentrated in the existing commercial district and town center to reinforce its viability. The new town-in-town concept, on the other hand, envisions the development of a complete new planned community with both residences and commercial and municipal facilities located in the same area.

Meeker has made plans to extend the necessary municipal services to the new areas of residential development, with developers paying a connection fee. Officials and recent surveys of Meeker residents indicate that the Town would prefer to attract about half of the new population. Since Rifle also has expressed an interest in attracting some of the new growth, a 50 percent--50 percent sharing of development between Meeker and Rifle would appear to best satisfy the wishes of local residents and officials. It is anticipated that, in practice, each town would attract approximately 40 percent of the new population with the remaining 20 percent settling outside the city limits or in other towns.

Both Meeker and Rifle are presently operating at housing and service capacity. Meeker has virtually no houses for sale or rent, and Rifle has a vacancy rate of about 5 percent. Both communities, therefore, would require approximately equal municipal expansion to accommodate growth. The status of housing and services in Rifle and Meeker is covered in detail in Chapters IV and V, while housing and service requirements of the population and estimates of the costs of municipal expansion are provided in Chapter VI.

3. Scenario 3: Concentraton of Development Primarily in Meeker or Rifle

There are a number of possible advantages of concentrating the population primarily in Meeker or Rifle rather than attempting to attract 50 percent of the new residents to each community. Economies of scale in terms of municipal services can be realized from greater population concentrations and more concentrated commercial facilities. Commercial facilities generally require a substantial population before they are located in a community. These minimum population levels might not be reached by either town in the case of a 50 percent--50 percent scenario.

The principal problem if a major portion of the population were to settle in Rifle would be the fact that the plant and tax base would be located in Rio Blanco County while the population impact would fall on Garfield County. The problem could be solved through a tax revenue sharing plan between the two counties, but no suitable mechanism exists at present in Colorado to facilitate such an arrangement.

In view of the difficulty of revenue sharing and the substantial difficulties to be faced if the majority of the new residents settle in Rifle without an arrangement for revenue sharing in advance, concentration of development in Meeker would seem to be the most feasible alternative to a 50 percent--50 percent split. If such a plan were to be implemented, other communities such as Rifle still would be able to attract a significant number of new residents. Experience with new communities indicates that even well planned and successful residential developments at best capture about 60 percent of the potential market, leaving 40 percent of the new population to settle in other communities.

4. Scenario 4: Development of a New Community

The alternative to concentrating growth in existing communities is development of a new town at either the Rio Blanco Store, where the Piceance Road from the Tract intersects the highway between Meeker and Rifle, or at White River City where the Piceance Road runs north from the Tract to intersect the highway between Meeker and Rangely. The major advantage of new town development would be to significantly shorten the commuting distance from the Tract. The primary disadvantages are the desire of Rio Blanco officials to prohibit new communities in favor of settlement within existing towns and the higher cost of new community development as compared to municipal expansion.

The gradual development of a new community or a major residential subdivision seems likely at White River City if the Superior Oil Project and Tract C-b were both to progress in the same period of time. The site of the former White River City, which no longer exists, would be the most convenient location for both employees of Superior Oil and Tract C-b. On the other hand, a development at the Rio Blanco Store would be equally accessible to Tract C-b and nearer to Rifle, Glenwood Springs and Grand Junction.

If Rio Blanco County remains firm in the desire to prohibit development outside the existing communities, it remains to be seen whether an effective zoning policy can be implemented to prevent subdivision development or the erection of mobile home parks at either White River City or the Rio Blanco Store in view of the fact that these locations would be natural points for settlement. To the extent that the industry participates in community development, through the purchase of land or by facilitating the provision of housing and services by others, the companies involved could reinforce the county's policies of minimizing growth outside existing towns through early planning and investment decisions.

Such an approach clearly calls for timely and close cooperation between industry and the county. Early planning and close coordination with Garfield County also would seem desirable if Garfield County wishes to attract residents to Rifle rather than facilitating their possible settlement in small subdivisions or mobile home parks further along the Rifle-Meeker highway near the Rio Blanco Store and nearer the Tract, within Garfield County (See Figure III-2). Effective and timely cooperation between Garfield and Rio Blanco Counties would be especially important if Rio Blanco enacts strict anti-sprawl zoning, and Garfield County takes a more laissez-faire approach to development. Such a combination of policies could encourage sprawl or poorly planned mobile home developments along the Meeker-Rifle highway just over the Garfield County line, and diminish the ability of Rifle to attract new residents at the greater distance into town.

E. The Phases of Community Development

A critical factor in planning for the orderly settlement of the new population is the timely provision of housing and services for the construction force, at acceptable levels of quality and cost, while minimizing excess capacity once the construction force is replaced by the permanent personnel. In order to minimize front end costs and excess capacity, many of the facilities for the construction force should be temporary. For example, water and sanitation extensions might be temporary; mobile classrooms might be more appropriate than school construction, and housing during the first phase should be designed to be replaced by more permanent residences.

Community development during the first phase will be difficult to plan and manage in an orderly cost-effective manner, yet effective planning for the construction phase is extremely important, since the basic long range settlement pattern is likely to be established then. To the extent they are haphazard or undersirable, initial settlement patterns will be difficult and costly to correct later. Rio Blanco County has shown an awareness of this process by requesting that an overview of plans for permanent community development accompany any plans for community development to accommodate the construction force.

Another solution for the construction phase would be the development of a permanent construction worker community within an existing town. This approach would be feasible and desirable if the oil shale industry progressed relatively rapidly and a number of different projects were underway during the same period. Employment at one site after another might be available in that circumstance for specialized construction workers residing in a relatively central location in the region.

A permanent construction worker community would solve the problem of the peaks and valleys of population influx associated with a temporary construction force as well as the problem of long term excess capacity of municipal facilities provided for the construction force. In addition, this approach would, of course, almost double the number of permanent jobs within the region as compared to use of a temporary construction force followed by permanent operating personnel.[1]

F. Estimates of Population Growth for Rifle and Meeker

This section discusses the anticipated population growth in Rifle and Meeker for each scenario. Table III-1 presents the baseline data used to project the populations of Rifle and Meeker without oil shale development. As can be seen, the current normal growth rate for the towns is significantly higher than that for counties. Rifle has a 5 percent annual growth rate compared to 3 percent for Garfield County as a whole, and Meeker is experiencing a 6 percent growth rate compared to 2 percent for Rio Blanco County.

The estimates of the 1975 growth rates for Meeker and Rifle represent the best available projections. The recent McDowell Smith report, from which these projections were obtained, was prepared for the Public Service Company and Mountain Bell. The survey had considerable input from the local Colorado West Area Council of Governments.

Extrapolations of future normal growth in these communities based on the McDowell Smith projections are necessarily very rough estimates. In view of the imprecise nature of the extrapolated population figures, a maximum range of normal population growth was projected for each town and the average was used as the future base population. The population associated with the plant has been added to the estimated future base

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[1] This idea was suggested by a representative of Cameron Engineers.

Table III-1
NORMAL ANNUAL POPULATION GROWTH RATES FOR GARFIELD AND RIO BLANCO COUNTIES, RIFLE AND MEEKER
(Without Oil Shale)

	Garfield	Rifle	Rio Blanco	Meeker
Base Year (1970)[1]	14,821	2,150	4,842	1,597
Assumed Annual Rate Without Oil Shale	.03	.05	.02	.06
Estimate (1975)[2]	17,182	2,743	5,686	2,137

Sources:

1. See accompanying volume, Volume I, Chapter V, Tables V-1 and V-3.
2. McDowell-Smith and Associates, 1975, pages 2-4. McDowell-Smith's study estimates that there are 2,750 people in Rifle and 2,150 people in Meeker in 1975. These estimates represent an approximate annual growth rate of 5% for Rifle and 6% for Meeker.

population anticipated to result from normal growth.

Thus, for example, in year 20 (see Table III-2) normal growth for Rifle might yield a population ranging from 4,810 to 6,931. Depending on the impact of the plant and the settlement pattern, Rifle's population could more than double as a result of oil shale development (Scenario (III) or the population could be scarcely affected (Scenario IV) if the population were to grow at five percent and there was a new town.

Tables III-2 and III-3 present the population build up for each scenario. The population numbers include the percentage of the total impact population assigned to each town, added to the normal growth projected for the town for each year of the project.

Rifle and Meeker's populations are currently quite similar in size. However, differential growth rates could yield quite dissimilar population sizes thirty years hence even without oil shale. For example, at a continuing growth rate of 6 percent, Meeker would have a population of 12,274 in thirty-one years, while Rifle would have a population of 5,219 in thirty-one years, with a steady growth rate of 3 percent.

The recent past tends to indicate that both Rifle and Meeker are experiencing rapid growth. A community experiencing an annual five or six percent population increase is chronically on the edge of shortage, whether it is in houses, classrooms or services. The detailed analysis of the current status of housing and services in Meeker and Rifle in the following chapters tends to substantiate the expectation that these communities are now operating at capacity. It is against this background that the impact of an oil shale population impact must be considered.

Tables III-2 and III-3 show the rapid build up of population in each town during the construction phase. This peak population, of minor boom proportions,will vary according to the scenario. Even in the new town situation, the peak population would add substantially to the existing town growth. Actual settlement patterns will depend largely upon the timely availability of housing and services, which, in turn, will depend on the growth policies and the zoning in each county and town.

G. Summary

The location of Tract C-b to existing communities and potentially good new town settlement areas provides several alternatives to consider for accommodating the population influx from this project. Also, the discussion in this chapter has illustrated the need for local and regional governments to work with each other and with industry in order to assure that the best settlement alternatives are selected and effectively carried out.

Table III - 2
RIFLE: PROJECTED POPULATION IMPACT

Development Stages	Year	Total Cumulative Years	Rifle Growth Without Oil Shale			Impact Population	Scenario I Scattered Development Along Rifle-Meeker Road (Rifle + 30%)		Scenario II Impact: Evenly Assigned to Meeker-Rifle: Managed Growth (Rifle + 40%)		Scenario III Major Growth to Rifle (Rifle + 70%)		Scenario IV New Town at Rio Blanco Store or White River (Rifle + 15%)	
			3%	4%	5%									
Phase I	1	1	(a)	(a)	2,743	0	(b)	(c)	–	–	–	–	–	–
Mine	2	2	2,825	2,853	2,880	1,413	3,277	19%	3,418	25%	3,842	40%	3,065	12%
Development	3	3	2,910	2,967	3,024	1,304	3,358	2%	3,489	2%	3,880	1%	3,163	3%
	4	4	2,997	3,086	3,175	229	3,155	-6%	3,178	-9%	3,246	-16%	3,120	-1%
	5	5	3,087	3,209	3,334	229	3,278	4%	3,301	4%	3,369	4%	3,243	4%
Phase II	1	6	3,180	3,337	3,501	2,579	4,111	25%	4,369	32%	5,142	53%	3,724	15%
Plant	2	7	3,275	3,471	3,676	7,200	5,631	37%	6,351	45%	8,511	66%	4,551	22%
Construction	3	8	3,374	3,610	3,860	13,461	7,648	36%	8,994	42%	13,033	53%	5,629	24%
	4	9	3,475	3,754	4,053	12,361	7,462	-2%	8,698	-3%	12,407	-5%	5,608	0%
Phase III	1	10	3,579	3,904	4,255	5,953	5,690	24%	6,285	-28%	8,071	-35%	4,797	14%
Operation	2	11	3,686	4,060	4,468	5,860	5,818	2%	6,404	2%	8,162	1%	4,939	3%
	3	12	3,797	4,223	4,691	5,860	5,981	3%	6,567	3%	8,325	2%	5,102	3%
	4	13	3,911	4,392	4,926	5,860	6,150	3%	6,736	3%	8,494	2%	5,271	3%
	5	14	4,028	4,567	5,172	5,860	6,325	3%	6,911	3%	8,669	2%	5,446	3%
	6	15	4,149	4,750	5,431	6,018	6,555	4%	7,157	4%	8,963	3%	5,653	4%
	7	16	4,274	4,940	5,702	6,137	6,781	3%	7,395	3%	9,236	3%	5,861	4%
	8	17	4,402	5,138	5,988	6,185	6,994	3%	7,612	3%	9,468	3%	6,066	3%
	11	20	4,810	5,779	6,931	6,280	7,663	3%	8,291	3%	10,175	2%	6,721	4%
	22	31	6,658	8,897	11,855	6,280	10,781	4%	11,409	3%	13,293	3%	9,839	4%

Notes:
- (a) Rates of growth are calculated in these three columns beginning with the estimated 1975 population of 2,743 given under the 5% column for year 1. This estimate is arrived at by escalating the 1970 census figure at 5% per year for 5 years.
- (b) The assumption was made that normal growth would level out to 4% per year. Therefore, the population given in the Scenario I column adds the population given in the 4% column under growth without oil shale to 30% of the impact population. The population figures given in the other three scenarios add the population in the 4% column to 40%, 70% and 15% respectively of the impact population.
- (c) The percentage figures given in these columns indicate changes from the previous year's population.

Table III - 3

MEEKER: PROJECTED POPULATION IMPACT

Development Stages	Year	Cumulative Years	Meeker Growth Without Oil Shale			Impact Population	Scenario I Scattered Development Along Rifle-Meeker Road (Meeker + 30%)		Scenario II Impact: Evenly Assigned to Meeker-Rifle: Managed Growth (Meeker + 40%)		Scenario III Major Growth to Meeker (Meeker + 70%)		Scenarios IV & V New Town at Rio Blanco Store or White River (Meeker + 15%)	
			2%	4%	6%									
Phase I	1	1	(a)	(a)	2,137	0	(b)	(c)	–	–	–	–	–	–
Mine	2	2	2,180	2,222	2,265	1,413	2,646	24%	2,787	30%	3,211	50%	2,434	14%
Development	3	3	2,223	2,311	2,401	1,304	2,702	2%	2,833	2%	3,224	0%	2,507	3%
	4	4	2,268	2,404	2,545	229	2,473	-8%	2,496	-12%	2,564	-20%	2,438	-3%
	5	5	2,313	2,500	2,698	229	2,569	4%	2,592	4%	2,660	4%	2,534	4%
Phase II	1	6	2,359	2,599	2,860	2,579	3,373	31%	3,631	40%	4,404	66%	2,986	18%
Plant	2	7	2,407	2,704	3,031	7,200	4,864	44%	5,584	54%	7,744	76%	3,784	27%
Construction	3	8	2,455	2,812	3,213	13,461	6,850	41%	8,196	47%	12,235	58%	4,831	28%
	4	9	2,504	2,925	3,406	12,361	6,633	-3%	7,869	-4%	11,578	-5%	4,779	-1%
Phase III	1	10	2,554	3,042	3,610	5,953	4,848	-27%	5,423	-31%	7,209	-38%	3,935	-18%
Operation	2	11	2,605	3,163	3,827	5,860	4,921	2%	5,507	2%	7,265	1%	4,042	3%
	3	12	2,657	3,290	4,057	5,860	5,048	3%	5,634	2%	7,392	2%	4,169	3%
	4	13	2,710	3,421	4,300	5,860	5,179	3%	5,765	2%	7,523	2%	4,300	3%
	5	14	2,764	3,558	4,558	5,860	5,316	3%	5,902	2%	7,660	2%	4,437	3%
	6	15	2,820	3,701	4,832	6,018	5,506	4%	6,108	3%	7,914	3%	4,604	4%
	7	16	2,876	3,849	5,121	6,137	5,690	3%	6,304	3%	8,145	3%	4,770	4%
	8	17	2,934	4,003	5,428	6,185	5,859	3%	6,477	3%	8,333	2%	4,931	3%
	11	20	3,113	4,502	6,466	6,280	6,386	(÷ 3)3%	7,014	2.67%	8,898	2.33%	5,444	3.7%
	22	31	3,871	6,931	12,274	6,280	8,815(÷11)	3.45%	9,443	3.18%	11,327	2.45%	7,873	4%

Notes:
(a) Rates of growth are calculated in these three columns beginning with the estimated 1975 population of 2,137 given under the 6% column for year 1. This estimate is arrived at by escalating the 1970 census figure at 6% per year for 5 years.

(b) The assumption was made that normal growth would level out to 4% per year. Therefore, the population given in the Scenario I column adds the population given in the 4% column under growth without oil shale to 30% of the impact population. The population figures given in the other three scenarios add the population in the 4% column to 40%, 70% and 15% respectively of the impact population.

(c) The percentage figures given in these columns indicate changes from the previous year's population.

4

CHAPTER IV

HOUSING, MUNICIPAL AND HUMAN SERVICES: RIFLE

CHAPTER IV HOUSING, MUNICIPAL AND HUMAN SERVICES: CITY OF RIFLE

A. Introduction

Provision of housing, municipal and human services for new residents in a community is one of the most immediate and critical problems associated with any large population influx. The maintenance of service to established residents can be made more difficult if existing systems are over-taxed.

This chapter describes the current status of housing, municipal and human services in Rifle. Existing facilities and services are reviewed in terms of carrying capacity, elasticity and overall conditions. Planned or proposed changes are discussed in terms of their adequacy in meeting the projected increased demand. The information presented in this chapter represents a compilation of the most recent data available. Some information is based on other reports, with the majority having been obtained through telephone interviews with local officials and site visits to the Rifle area.

The city of Rifle currently has no Master Plan. However, a number of different studies of individual services and other areas of local concern are underway. It is anticipated that these studies will be combined to form the Rifle Master Plan within a year and a half. The studies now being done include an EPA "201" sewer study; a Land Use and Open Space Plan, financed through the State's "1041" and "701" programs; a Capital Improvements Plan; a municipal authorized street plan; and a total revision of the local subdivision regulations.

In general, there is a strong interest in attracting growth in Rifle and a diversity of views concerning the most desirable directions for the future character of the community. The enactment of a new tap fee indicates Rifle's intention to insure that new development pays its way. Garfield County developed and adopted county wide zoning within the last two years, which seeks to preserve environmental assets and more fully evaluate and control industrial development, and which now provides for PUD residential development. The county zoning combined with the new Rifle guidelines should give local officials the capability of directing development in an orderly fashion. Figure IV-1 illustrates several of the proposed residential developments and other projected land uses in the Rifle area.

B. Current Status of Housing

1. Housing Availability and Cost

According to the 1970 census there were 803 housing units in Rifle in 1970. Of these 803 units, 92 percent (739) were occupied year-round and 63 percent (503) occupied by the owner. Of all the year-round units in Rifle, 74 percent (596) were single family units

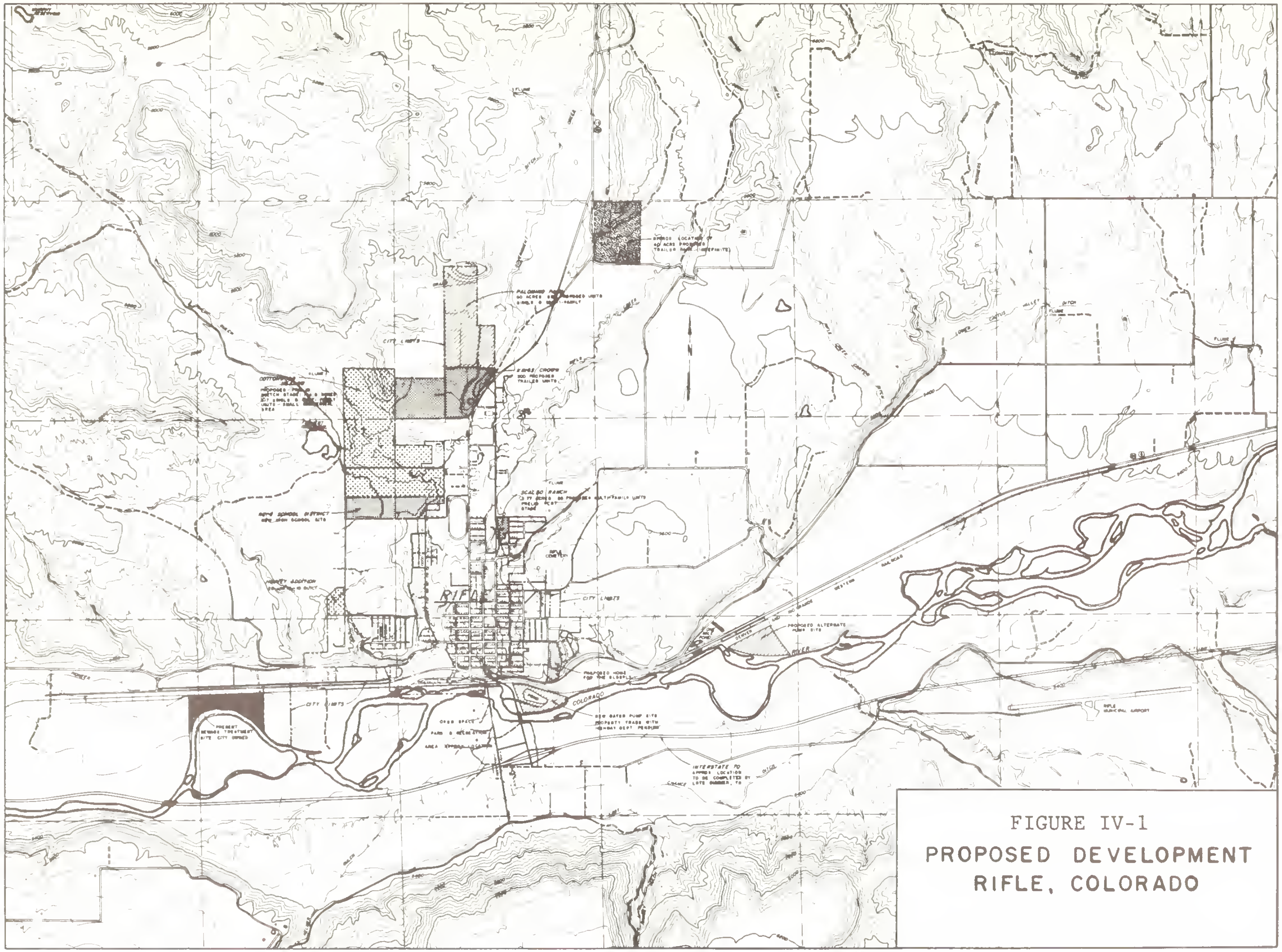

FIGURE IV-1
PROPOSED DEVELOPMENT
RIFLE, COLORADO

and 7 percent (59) were mobile homes. Only 5 percent (42) of the year-round units were vacant, including those not in a livable condtion.[1]

Table IV-1 shows recent additions to the housing inventory based on the number of building permits issued for single family housing during the period 1970-1975. Table IV-1 shows that a net total of 52 single family units have been built in Rifle since 1970 resulting in a total of 648 single family units in the city. A recent inventory of trailers by the city planning office shows 89 trailers and 5 empty trailer pads within the city limits. The inventory reveals that 30 trailer units have been added in Rifle since the 1970 census. The addition of 52 new single family units and 30 trailers since 1970 makes a current total of 885 housing units in Rifle.

According to recent estimates, costs have increased substantially since 1970. Local realtors estimate that six new homes are available for sale at a range of $31,500 to $66,000 and 21 older homes at a range of $9,000 to $80,000 in the Rifle area. The average cost of a single family home in Rifle is around $32,500. Four to five rentals are currently available with a range of rents from $150 to $300 per month.[2] Five trailer pads are available for rent at the time of this writing and 10 are being added at the Sleepy Hollow Trailer Court outside the Rifle city limits.

The vacancy rate for mobile homes in Rifle is currently about 5 percent, computed on the basis of 5 available trailer pads out of 94 total pads. A vacancy rate of about 5 percent also applies to single family units, considering that 27 homes are for sale and 5 (out of a total of 614) are currently for rent. These rough estimates of the vacancy rate for Rifle show that Rifle has about 2 percent more vacancies than the region as a whole, which had an overall vacancy rate of 3 percent in 1970.[3] Both rates are low compared to national standards for desirable vacancy rates of 6.6 percent.[4]

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1. Bowers and Associates, 1974, p. 39 (based on U.S. Census, Census of Housing, 1970).

2. Rifle area realtors, telephone interviews, October, 1975.

3. Bowers and Associates, 1974, p. 39.

4. U.S.Census, Current Housing Reports, Housing Vacancies, August, 1975.

Table IV-1
RECENT HOUSING CONSTRUCTION IN RIFLE
(1970-1975)

Year	New Housing (Single-Family) [a]	Houses Razed	Net	Net Change in Number of Bedrooms [b]	Net Change in Number of Commercial Units [c]
1970	11	0	11	25	0
1971	3	1	2	9	0
1972	0	0	0	1	0
1973	4	0	4	14	0
1974	14	1	13	35	14
1975	25 [d]	3	22	55	0

Notes:

(a) These construction calculations are based on the number of building permits let in the respective year.

(b) Includes bedrooms added or lost due to remodeling, etc.

(c) Hotel and motel rooms.

(d) 5 houses not yet completed, bedrooms not counted.

Source: Rifle City Planning Office, October, 1975.

Mobile homes are generally owned by the resident and the turnover rate has been fairly low. New mobile home prices vary with the size of the unit. A 14' by 56', 2 bedroom mobile home with all utilities and sheetrock walls is locally priced at $6,600 delivered and set up. A 14' by 60', 3 bedroom unit, comparably equipped, is priced at $6,700 and a 24' by 60' unit at $12,000, delivered and set up.[1]

Local realtors estimate the cost of trailer parks to run $5,000 per pad including paved streets, curbs and gutter, all utilities, a metal storage shed and a recreation area.

Most houses in Rifle are standard frame construction. The average construction costs per square foot are estimated to range from $20 to $25.[2] There are 110 undeveloped lots, approximately 25' by 125', currently available in Rifle. These lots would actually provide about 55 developable sites at a price of $5,000 to $6,000 each. According to local realtors, land prices have roughly doubled over the past 18 months, although the average turn around time for a house for sale in Rifle is described as still very short.

2. New Housing

In terms of immediately available housing, therefore, Rifle could not presently accommodate a substantial population impact. Most of the housing impact that Rifle could presently accommodate probably would require that families have incomes higher than the mean income of Garfield County families which was $9,638 in 1970.[3]

However, Rifle does have a number of subdivisions in various stages of preparation. Two subdivisions, Palomino Park and King's Crown Trailer Park, have been approved and platted. The proposed Palomino Park development will provide approximately 285 single and multi-family units on a 60 acre site. Palomino Park is located at the north end of Rifle, west of Highway 13. King's Crown Trailer Court is located in the northern part of the city, west of Highway 13 and south of the Palomino Park Development, and could provide up to 350 units. The total number of units could be installed as soon as utilities and streets are provided. However, utilities must be provided by the developers. A third subdivision, a small area development known as the Hovey

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1. Rifle Mobile Homes, telephone interview, October, 1975.

2. Rifle area realtors, telephone interviews, October, 1975.

3. Bowers and Associates, 1974, p. 83.

addition has 10 new units that have been sold and has the possibility of accommodating 18 additional units. This site is located in the west-central part of Rifle.

At this writing, three other developments are in the preliminary platting or preliminary planning stages. Cottonwood Meadows, located on the northwest side of Rifle just outside the city limits, is in the preliminary sketch stage. The site is bordered in part by the King's Crown Trailer Park site to the east. Cottonwood Meadows comprises 134.6 acres for which 517 single and multi-family units, and a small service area is proposed. The Scalzo Ranch subdivision is in the preliminary platting stage. This site consists of 3.77 acres located near the center of Rifle, outside of the east boundary of the city. Fifty-six multi-family units are proposed for this development. The proposed Rifle Village South Subdivision, which lies south of the Colorado River, may provide 500-600 units and a commercial area, contingent on the Rifle Village, South Metropolitan Districts' provision of services. None are available and future plans are presently unclear.

Two other developments have been proposed. One of these is a 40 acre trailer park northeast of the city and east of Highway 13. This development is in the preliminary discussion stage. The park would consist of 40 acres and could provide up to 200 units. However, new utility lines would be necessary and are not likely to be provided unless the area is incorporated into the city limits or the developer supplies the capital. Finally, a home for the elderly to house about 100 residents has been proposed. This development would be located south of the city limits and north of the railroad. No action has been taken as yet on this development.

3. Recent City Regulations for Development

The Rifle City council is presently rewriting the codes and ordinances regulating local development. Currently, a point system is used to assess the water tap and improvements fee. Points are assessed by the number of fixtures and taps using water in a residential development. The fees are collected and held for future improvements in the water system. The minimum fee for a trailer pad or house is $1,410. An average fee for a 3 to 4 bedroom house with two baths and outside water spigots is $1,550. More fixtures could raise the fee assessment.

Commercial properties are assessed according to the size of the water pipe to the tap. A minimum fee of $900 would be assessed against an establishment using 3/4" pipe. Points are assessed in addition to the pipe size assessment and fees are collected on this basis as well. The point system for assessments has been in effect for only 3 months and no commercial building has taken place under the new assessment system.[1]

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[1] Rifle City Planning Office, telephone interview, October, 1975.

The old codes required provision of utilities and graded streets with curb and gutter. Palomino Park and King's Crown developments will be required to conform with the old codes. All future development probably will require provision of utilities, paved streets, street lighting, donation of land for public purposes, bicycle paths and other improvements.

Current development seems to be limited and most proposed subdivisions are being held at the preliminary approval stage, because of developers' fears that demand may not materialize soon enough to justify the high front-end tap and improvements fee. However, Rifle does seem to be taking steps to assure that development will pay its way when the market for such housing does appear.

C. Current Status of the Water Treatment and Delivery System

1. The Existing System

The city of Rifle owns its water system serving 980 water taps, including some out of town.[1] The city has absolute rights to 8.5 cfs from the Colorado River, 1.8 cfs from Rifle Creek and .67 cfs from Beaver Creek and conditional rights to 7.5 cfs from the Colorado River and .25 cfs from Beaver Creek.[2]

The city uses an average of 763,000 gallons per day to accommodate a current population estimated at between 2,500 and 2,750 people. The average per capita consumption is around 300 gallons per day. Two treatment plants provide water for Rifle: the Graham Mesa plant and the Beaver Creek plant. The Graham Mesa plant is located northeast of town and pumps water from the Colorado River to the plant; a gravity flow system transfers water from Beaver Creek to the Beaver Creek plant.

A study by McDowell-Smith and Associates outlines four problems with Rifle's water system:

(1) Limited water rights and unreliability of the finished water transmission line at the Beaver Creek plant.

(2) The raw water pump system for the Graham Mesa plant is unreliable, inefficient and does not have sufficient capacity. Twice during the period that the investigation was underway, a river pump failed and lawn sprinkling was curtailed.

(3) Filter media and piping arrangement at the Graham Mesa plant are inefficient, especially during the Spring when the raw water supply is very turbid.

(4) Fire flow is insufficient and pressure at high flows is inadequate in certain portions of the city.

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[1] McDowell-Smith and Associates, 1975. pages 22/26-22/28.

[2] Cfs is cubic feet per second.

Three water storage tanks serve the city: a 600,000 gallon tank located at the Beaver Creek plant, a 250,000 gallon tank located at the Graham Mesa plant, and a 500,000 gallon tank located at the cemetery. The water distribution system for the city is a grid of 4, 6, 8 and 12-inch lines made for the most part of cast iron pipe and asbestos cement pipe. Parts of the pipe system are reportedly in need of repair. In addition to the sections in need of repair, the 4-inch sections should be replaced with larger diameter line.

The McDowell-Smith study shows that the raw water collection component of the system is operating at its capacity of 1.68 MGD (million gallons per day) primarily because of restricted water rights on Beaver Creek and restricted wet well capacity on the Graham Mesa intake. The water transmission component is operating at 1.68 MGD but has a capacity of 3.24 MGD if the pumping capacity of the Graham Mesa plant can be upgraded and additional Beaver Creek water rights can be secured. (See Table IV-2.)

The treatment component is operating at 1.68 MGD with a potential for 3.08 MGD if the clarifier capacity at the Graham Mesa plant can be upgraded. The tank storage capacity is 1.35 MGD and is functioning at capacity. The treated water transmission system has a current flow of 3,800 GPM with an estimated maximum of 4,800 GPM.

2. Source of Funds for Water System Improvements

The necessary improvements and estimated costs of a water system to accommodate 8,600 people by 1980 are outlined in Table IV-2. The system improvement fee recently enacted by Rifle is designed to put the costs of growth from new development on a pay-as-you-go basis. The revenues will be used to improve and expand the water system to accommodate new growth. Rifle has also been allocated a loan of $400,000 for water system improvements from the Oil Shale Lease Fund. Interest rates and a repayment schedule are contingencies that may make this funding source less workable than bonding. McDowell-Smith states that with outside assistance the Rifle water system should be able to accommodate a population of 8,600 by 1980.

D. Current Status of Sanitation Facilities

1. The Existing System

Rifle owns and operates a sanitation system serving 860 sewer taps including a few taps outside of town.[1] McDowell-Smith measured the average daily total flow into the plant at an average of 112 gpcd or 308,000 gpd. Sewage flow excluding infiltration was 46 gpcd or 126,000 gpd for the five-day period measured. Average total infiltration was measured at 180,400 gpd.

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[1] McDowell-Smith and Associates, 1975, pages 22/29-22/42.

Table IV - 2

WATER FACILITIES SUMMARY AND FUTURE ESTIMATED COSTS FOR RIFLE (1975-1980)

End of Year	Population	Maximum per Capita Day (gped)	Total Maximum Day (mgpd)	Required Storage Capacity (million gallons)	Required Transmission Capacity Treated Water (gpm)	Scheduled Improvements	Estimated Cost[(a)]
Present	2,750	600	1.65	0.870	3,800	Item 1: Network analysis, feasibility. Installation of meters and level controls and utilities – master plan	$ 33,000
1975	2,900	400	1.16	0.760	3,300	Item 7: Distribution System Improvements	100,000
1976	3,500	400	1.40	0.820	3,700	Item 2: Graham Mesa raw water collection and pumping a. design	10,000
1977	4,200	400	1.68	1.137	4,200	Item 2: Graham Mesa raw water collection and pumping b. construction	120,000
1978	5,400	400	2.16	1.359	4,800	Item 3: Graham Mesa Plant Improvements	36,000
						Item 4: Beaver Creek Plant Improvements	30,000
						Item 5: Graham Mesa Plant Expansion	240,000
						Item 6: Construct 1,000,000 gallon storage tank	420,000
						Item 7: Distribution System Improvements	456,000
1979	6,900	400	2.76	1.748	5,600		$1,445,000
1980	8,600	400	3.44	2.200	6,500		

Note: (a) All cost estimates reflect an annual inflation rate of 10%.
Source: McDowell-Smith and Associates, 1975, pages 22-28.

The sewage treatment system consists of an aerated stabilization pond plus a non-aerated polishing pond. The existing and potential capacity is 2,600 persons. Since McDowell-Smith estimated the population of Rifle to be 2,750 in July, 1975, the sewage system is now operating over capacity. However, capacity could be increased with the addition of aerators to the second pond and use of the existing clarifier and digestor.[1]

The collection system consists of 55,600 feet of 3 to 15 inch sewer mains and an estimated 51,600 feet of service lines. The mains vary greatly in composition including vitrified clay, asbestos fiber, asbestos cement, corrugated metal pipe and PVC. Some of the smaller pipe could not be extended to new development areas and the small pipe may also be difficult to clean when that is necessary. The sewage pipe had an excessive infiltration rate of 1,510 gallons per day per inch diameter of pipe mile (gpd/in. mile) during the test period. Infiltration is the inflow of substances other than sewage such as water from storm drains or springs. Allowable infiltration is 250 gpd/in. mile. Infiltration accounts for approximately 59 percent of the total hydraulic load on the sewage plant.

The lack of chlorination and the presence of algae in the effluent are also problems that may require attention since the State effluent standards are becoming more stringent. McDowell-Smith reports that all standards have been met with the exception of suspended solids measured at 39 and 43 mg/1 compared to the standard of 25 mg/1.

2. Source of Funds for Sanitation System Improvements

Table IV-3 shows the consultant's recommendations for upgrading the sanitation system to meet larger population demands. Rifle has been granted $20,000 from the Environmental Protection Agency under its "201" program to begin studying ways to upgrade the sewer system. The firm of Nelson, Healy, Patterson and Quirk is currently conducting a study of the water and sewer systems under this grant.

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1. An aerated stabilization pond facilitates waste matter oxidation by transfer of exygen from the air to waste matter, whereas a non-aerated polishing pond oxidates waste matter by exposure to the sun and air. A clarifier is a settling tank that provides for the separation and removal of organic matter. A digestor uses either aerobic or anaerobic bacteria to destroy the organic matter. Anaerobic bacteria create mathane gas which may be pumped off and utilized for fueling plant facilities or vehicles. Aerobic bacteria do not create methane gas.

Table IV - 3

SEWAGE TREATMENT FACILITIES SUMMARY AND FUTURE ESTIMATED COSTS FOR RIFLE (1975-1980)

End of Year	Population	Maximum Day (gped)	Maximum Day (gpd)	Maximum Day(a) BOD_5 (1h/day)	Scheduled Improvements	Estimated Costs(b)
July, 1975	2,750(c)	112	308,000	467		
1975	2,900	109	317,000	493	Item 1: Feasibility studies, measurement devices and sewer master planning. Work includes everything necessary for EPA Zol Step 1.	$ 28,500
1976	2,500	101	355,000	595	Item 2: a. Deepen and aerate Pond 2; add chlorination system.	93,000
					Item 3: Correction of selected sources of infiltration.	33,000
1977	4,200	100	420,000	714	Item 2: b. Add 3rd aerated stabilization pond, chemical addition and slow sand filter.	304,000
1978	54,000	100	540,000	918	Item 4: Construct relief sewer.	145,000
1979	6,900	100	690,000	1,173		
1980	8,600	100	860,000	1,462		
						$ 603,500

Notes:
(a) All cost estimates reflect an annual inflation rate of 10%.
(b) Based on 0.17 lb/day of BOD_5 per person
(c) This table presents projections made by McDowell-Smith and Associates. The figure 2,750 represents their estimate for the middle of 1975. This figure will be used for the analysis here because no change seems to have occurred since this projection was made.

Source: McDowell-Smith and Associates, 1975, pages 22-42.

Under conditions of normal growth, the tap and improvement fee and service fee would probably be sufficient to fund maintenance and system upgrading. More rapid growth may require that the city float bonds. The bonds could be paid off with a mill levy on property or with the service and tap and improvement fees, although there would be a lag time before actual costs could be met with the levies and fees.

Additional funds could come from the "201" program which might provide for construction after the systems have been studied to determine the community's needs. Funding might also come from the Oil Shale Lease Fund in the form of loans. However, problems of interest and debt repayment schedule need to be worked out if the use of these funds for improvement of both water and sanitation systems is to be effective.

E. Current Status of Schools

The West Garfield School District, RE-2, serves the area surrounding and including Rifle, Silt and New Castle. The population of these towns is estimated at 2,750, 750 and 625 respectively, although the schools serve areas beyond the town boundaries. The service area for the school district runs approximately 2 miles east of New Castle, west one-quarter of a mile from Rulison, south to the Mesa County line and north to the Rio Blanco County line.

Table IV-4 shows the current enrollment, capacity, number of teachers and student-teacher ratio for schools in the area. Each of the three towns has an elementary school. Currently, Silt has 208 elementary students and 9.6 teachers, New Castle 276 students and 8.9 teachers, and Rifle 453 students and 24.5 teachers. The number of teachers is stated in fractions because some teachers work part-time at more than one school each day.[1] There are 68 students at the New Castle Junior High School and 6 teachers. At the Rifle Junior High, there are 204 students and 12.8 teachers. The Rifle Senior High School has a current enrollment of 453 students and a faculty of 29.2 teachers.

The area schools have a capacity of 1,525 students, and presently have a total enrollment of 1,573 students with 91 teachers. There is a total of 86 rooms in the districts' schools including two mobile rooms recently added to the high school.

In terms of classroom capacity, only the elementary school at Rifle is operating below capacity. The over-all faculty to student ratio, however, is close to the average criteria of 25 students per teacher with the exception of the New Castle Elementary School.

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1. The information in this section was obtained from the Superintendent of Schools, West Garfield School District, RE-2, telephone interview, October, 1975.

Table IV - 4

CURRENT ENROLLMENT, CAPACITY, NUMBER OF TEACHERS AND STUDENT-TEACHER RATIOS IN RIFLE SCHOOLS

(West Garfield School District RE-2)

School	Current Student Enrollment	School Capacity	Number of Teachers	Student/ Teacher Ratio
Elementary Schools				
Rifle	453	575	24.5	18.5/1
Silt	208	175	9.6	21.7/1
New Castle	276	250	9.8	31/1
Junior High Schools				
Rifle	204	150	12.8	15.9/1
New Castle	68	–	6.0	11.3/1
High Schools				
Rifle	453	375	29.2	15.5/1

Source: Superintendent, West Garfield School District RE-2, October, 1975.

F. Current Status of Health Services

The Rifle area is served by Claggett Memorial Hospital and the E. Dame Moore Memorial Nursing Home. The service area of the hospital runs north to the Rio Blanco County line, east to New Castle, west to the Mesa County line and to a point roughly 50 miles south of Rifle. The hospital is estimated to serve a population between 6,000 and 7,000 people. The hospital has a capacity of 32 beds and the nursing home has a licensed capacity of 54 beds and is operating at capacity.[1]

Five doctors, including 2 general practitioners, 1 general surgeon, 1 pediatrician, 1 internist, and 10 nurses, including 8 registered nurses and 2 licensed practical nurses, serve both the hospital and the nursing home. The doctors also participate in a program providing some visiting services to Rangely. In addition, the hospital is beginning to attract surgery and pediatric patients from outside the service area because of their specialized staff.

The hospital had 4,589 in-patient days during the period July, 1974 through June, 1975. The nursing home had 19,064 in-patient days during the same period indicating a relatively large demand for elderly care.[2] The hospital serves an average of 12.6 patients per day. According to national standards, the hospital could serve another 19.5 people per day. In 1974 it was estimated by the hospital's administration that the facility could serve a population roughly double the current population. Considering peak days, possible fluctuations in the number of available doctors, and the additional patients now coming from outside the normal service area, that estimate would now be high--according to the most recent assessment by the hospital administration. However, state standards indicate that 2.45 hospital beds are required per 1,000 population.[3] By this standard, the hospital could accommodate a total population of 13,000 people, as compared to the 6,000 - 7,000 now served.

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1. The information about Claggett Memorial Hospital and the E. Dame Moore Nursing Home was given by the Claggett Hospital Administrator, in a telephone interview, October, 1975.

2. The Colorado West Area Council of Governments commented that the area does not need more specialized home care but does need low income housing for the elderly.

3. Bureau of Land Management, 1975, p. 348 (based on Colorado Department of Health, 1975, p. A-57).

G. Current Status of Utilities[1]

Utilities, specifically gas and electricity, are provided to the communities in the region through a state wide system. The nature of this system, known as an interchange, precludes the possibility of identifying sources and capacities for specific towns. The amount of gas and electricity generated by individual plants can be determined, as can the total amount of each commodity sold in a given region. In addition, the general capacities which can be delivered to certain areas can be broadly defined by identifying the limiting factor in the system, most frequently the transmission line capacity. Thus, discussion of the demand for and availability of power must be regional rather than site-specific in scope.

Utilities for the Colorado River Valley communities, with the exception of Glenwood Springs, are provided by the Public Service of Colorado (PSC). Public Service provides gas through its wholly owned subsidiary, Western Slope Gas Company. Glenwood Springs buys electricity in bulk from PSC and then resells it to local customers. Gas for Glenwood Springs is provided by Rocky Mountain Natural Gas Company. Public Service Company electricity generating stations, which serve the three county area, are Cameo, generating 79 megawatts (MW), Shoshone (12.5 MW), and Fruita (25 MW). The Colorado-Ute generating stations are Nucla (39 MW), and Hayden (180 MW). Virtually all new residential and commercial buildings in the western slope region use natural gas for heating purposes. The majority of buildings use natural gas.

Gas supplies of both PSC and Greeley Gas come primarily from local wells either operated by the companies or independently owned.

Electrical transmission lines, although individually owned by the various suppliers, are used on a cooperative basis. The main lines serving the region are a 230 kilovolt (kv) line from Cameo to Denver, a 69 kv from Glenwood Springs to Grand Junction, and a 230 kv line, owned by the Bureau of Reclamation, from Rifle to Hayden. The kilovolt designations refer to the carrying capacity of the line, and it is this which places an effective limitation on the amount of the electricity which can be provided to a particular service area at any given time.

Although specific data on the amount of power consumed in the region are not available, the suppliers state that they have sufficient capabilities to meet present and future demand based on normal growth rates. An indication of this surplus is the fact that Colorado-

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[1] The data in this section were obtained in conversation with representatives of the Public Service Company of Colorado, the Western Slope Gas Company, and the Greeley Gas Company, Oct. 1975.

Ute, with a 360,000 kilowatt capacity in 1974, experienced a peak demand of 258,000 kw in that year.

Gas supplies for the region, however, are not as plentiful as electricity. Although the major suppliers report that they have sufficient quantities to meet current demand, new sources are becoming increasingly hard to acquire as the demand for gas increases. Spokesmen for the major supplying companies report that with adequate lead time they will be able to meet the increased demand from residential and commercial growth. They emphasize, however, that the lead time provided by orderly rather than sudden and unpredicted growth will be vital to the timely expansion of their systems of supply.

As mentioned, the standard policy of the power suppliers is to plan only for demand based upon normal growth. The capital costs involved in the construction of power plant facilities prohibit speculative expansion. The major suppliers feel confident that they will be able to accommodate the future demands of energy related population growth, through the flexibility provided by the statewide interchange system. Officials of Public Service hasten to add, however, that this ability to meet increased demand does not include the provision of power to fuel the oil shale plants themselves.

Two major power generating plant projects are now under construction in northwestern Colorado, Hayden Station #2, and the Yampa project. Both are cooperatively owned projects in which the power generated will be shared among the owners, some of whom are out-of-state suppliers. By 1982 the Hayden plant will supply 125 megawatts of electricity to the Colorado-Ute service area. The Yampa project will increase the Colorado-Ute system capacity by another 220 megawatts by 1980. Again, these projects are being built solely on the basis of normally increasing demand.

Given the necessary lead time for expansion, the provision of power should not pose any serious limitation upon residential or commercial development.

H. Current Status of Transportation

Garfield County has 165 miles of state highways and 911 miles of county roads. The city street system in Rifle consists of two miles of arterial streets and eleven miles of local streets. Rifle is served by routes US 6 & 24 (Interstate 70 traveled - way) and State Highway 13.[1]

The 1973 Origin and Destination Study showed the area of major internal traffic congestion to be the intersection of Railroad Avenue and Third Street. Other average daily traffic volumes occurring during the Summer, 1973 were 4,800 at the east edge of Rifle and 1,800 on State Highway 13 north of Rifle.[1]

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[1] Colorado Department of Highways, Rifle External Origin and Destination Study, 1973, p. 2.

An analysis by the Colorado Division of Highways described the existing road systems (city, county, and state) as having previously been adequate, "but with increased traffic from oil, coal, gas and oil shale exploration, and other developments, they have quickly become very inadequate to handle both local traffic and this recently created traffic".[2] Current plans are to upgrade State Highway 13 to move through traffic and to route the bulk of local traffic onto county roads and main city streets. The analysis concludes that other modes are presently unjustifiable because of the rural nature of the area, low population densities and concentrations, and economics.

I. Current Status of Police Protection

Six officers serve on the Rifle police force: 1 chief, 1 lieutenant, 1 sergeant and 3 patrolmen, each of whom works a different shift. Other staff include 1 secretary and 6 part-time dispatchers. There are two cars used by the force.[3] Based on standards of 2 officers per 1,000 people and 1 vehicle per 1,500 people,[4] Rifle is currently operating at about capacity for law enforcement.

The police force uses the basement of the Town Hall for its office space. The area is estimated to be about 2,400 square feet with potential to expand by using the remainder of the basement. Standards for office space are about 200 square feet per 1,000 population increment.[5] By this standard, Rifle has more than enough space to house a much larger police force. There are two cells available for holding prisoners, only one of which is operable. This cell can contain up to 3 prisoners on a temporary basis.

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[1] Colorado Department of Highways, Air Quality Analysis, 1973, p. 6.

[2] Colorado Department of Highways, Air Quality Analysis, 1973, p. 7.

[3] Rifle City Police Department, telephone interview, October, 1975.

[4] VTN, Colorado, 1975, p. A-85.

[5] VTN, Colorado, 1975, p. A-85.

The county is served by a sheriff's department consisting of 6 officers and 4 vehicles. Considering the size of the county, the sheriff's department has limited staff and vehicles for the job. The law enforcement staff, structures and vehicles will have to be expanded proportionately as population increases.

J. Current Status of Fire Protection

Rifle has 25 volunteer firemen, 1 fire station, 1 pumper truck and 2 emergency vehicles. The rural fire department utilizes the same volunteer personnel in addition to 1 station, 1 pumper truck and a 400-gallon capacity pick-up tanker.[1]

Approximately 69 fire hydrants are in the city's fire-water distribution system. The hydrants are mostly equipped with 2.5-inch host nozzles and a few with a 4-inch pumper nozzle. McDowell-Smith estimate that 7 to 10 more hydrants are needed to provide adequate coverage for the town. The standard distance between hydrants is 500 feet at a maximum. Insurance tests on the water flow system show that the fire flows are adequate for the downtown area, but inadequate in the outlying areas to the north and west.[2] The recommendations given by McDowell-Smith for upgrading the water system would improve the fire flow pressure. The costs of the fire-water system upgrading would be figured in the total costs of the water system.

According to existing standards, any major increase in the population density of Rifle would require a full-time professional fire protection staff. The desirable number and location of fire stations must be analyzed in terms of the specific area. The general guidelines have been stated as follows:

> "Sufficient stations should be provided so that no point in a high value district will be more than 1 mile travel distance from an engine company or 1 1/4 miles travel distance from a ladder company except that for districts requiring a fire flow of 9,000 gpm or more, these distances should be 3/4 mile and 1 mile respectively, and in districts requiring a fire flow less than 4,500 gpm these distances may be 1 1/2 miles and 2 miles respectively. Distribution should also provide for ready concentration of companies to multiple alarm fires in any high value district, and in areas where the life hazard is severe, without stripping other sections of protection in case of a second fire.

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1. Rifle City Fire Department, telephone interview, August, 1975.

2. McDowell-Smith and Associates, 1975, p. 22/18.

> The majority of building fires occur in and around the older portions of most cities where congestion is greater, values higher, and buildings lack those structural features essential to protect life and to restrict the spread of fire. Therefore, there should be no general elimination of stations or companies, nor wider spacing in these portions of most cities. Exceptions are where a station is in an area no longer of high value, is so situated that company runs are all in one direction, or the effective response has been reduced by limited access highways or other construction; in these instances, relocation would be desirable.
>
> In average residential districts, response distances may be increased up to 2 miles for engine companies and 3 miles for ladder companies or companies providing adequate ladder service. However, for closely built residential districts requiring more than 2,000 gpm fire flow or having buildings 3 or more stories in height, including tenement houses, apartments, or hotels, the distances should be reduced to 1 1/2 and 2 miles respectively. Where the life hazard is above normal, it may be necessary to further reduce these distances to 1 and 1 1/4 miles respectively."[1]

K. Current Status of Library Facilities

The library in Rifle currently has 12,000 volumes. However, many of these volumes are out-of-date reducing the actual number usable. The total floor space is 1,200 square feet and yearly circulation is around 7,200 volumes, at a rate of 600 to 700 per month. The library is open from 2:30 to 4:30 and 7:30 to 8:30 p.m. Mondays through Thursdays, 2:30 to 4:30 Fridays and closed on weekends.[2]

The Rifle Library is expected to become part of the county system early in 1976. After this time, the library will be open 60 hours a week, collections will be expanded and the library will begin a periodicals collection. Check-outs and memberships will be more open than current policies allow. Check-out periods will probably be three weeks with a one week grace period. A story hour period will begin with the introduction of the county system and an arts and crafts program may be developed for children in the summers.

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1. DeChiara, 1975, p. 356.

2. Director of the Garfield County library system, telephone interview, October, 1975.

The library service area will roughly extend to Grand Valley, Rulison and Anvil Points under the county system. The city council is considering relocating the library in another building or building a new structure because of the current shortage of parking space.

According to standards of 3.5 - 5 books per capita and .7 - .8 total square feet per capita,[1] rifle's library is currently inadequate for a population of 2,750. Considering the expanded service area, the need for parking space and the age of the collection, a major upgrading for the library will be required even with normal growth conditions.

L. Current Status of Recreational Facilities

Rifle has summer recreation facilities adequate for a population 4-5 times its current size.[2] The winter recreation facilities are quite limited, however.

The Rifle area has three parks including one County Fairground, one golf course, two tennis courts, and two swimming pools.[3] Two reservoirs and the Colorado River nearby are available for boating and fishing. Private land and the White River National Forest are available for hunting. Six ski areas are located within 75 miles and 3 areas are available for snowmobiling within 20 miles from Rifle. A number of leagues for baseball, football and basketball are available. There is one indoor movie theater.

Five major events are held each year: The Garfield County Fair, the High School Rodeo, the State Appaloosa Horse Show, a Sidewalk Bazaar and Street Dance, and the Colorado River Skippers Water Ski Show.

Six national areas are located nearby including 3 national forests, 1 national monument and 1 primitive area. There is 1 museum six miles from Rifle and there are a number of public and private camp grounds available.

Although the exact number of acres available for recreation in the Rifle area would be difficult to calculate, it can be seen that outdoor facilities for active recreation are adequate to support a much larger population. However, facilities for passive recreation such as concert halls and zoos, and indoor athletic facilities, such as handball courts and gymnasiums, are presently insufficient or unavailable.

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1. DeChiara, 1975, p.7.

2. Michael Kuntupis, Rifle City Council member, October, 1975.

3. The information listed here was taken from United Banks, 1974, Recreation and Cultural Facilities.

M. Current Status of Human Services

Most of the human services available to Rifle residents are located in Glenwood Springs. However, Rifle has a public health nurse, and food stamps and social services counseling are provided twice monthly in the town. Mental health services are located in Glenwood Springs. Developmental disabilities programs for children and physical rehabilitation programs are generally administered in Glenwood Springs, although some developmental disabilities services are provided for in the Rifle school system.

Transportation for the elderly is provided every other day with service from Grand Valley to Carbondale. There is a small, pilot, hot-foods program for elderly residents and a private housing project has been proposed.

Juvenile and adult corrections are administered from Glenwood Springs or from Grand Junction depending on the problem.

Two cemeteries are located in Rifle and at least 7 churches.

A substantial population increase would require the location of additional human services in Rifle and expansion of the programs offered, especially in view of the adjustment problems which traditionally accompany rapid growth and conditions of temporary settlement.

N. Summary

Table IV-5 summarizes the current status of services in Rifle, the improvements proposed and/or planned and a brief description of each.

Table IV - 5

RIFLE – SUMMARY OF SERVICES

Service	Current Status	Improvements	Remarks
Housing	Inadequate	2 planned developments 5 proposed developments	Two developments totaling as many as 535 units have been approved and platted with construction to begin as early as spring of 1976. The other 5 developments totaling 1,401 units, are in the preliminary planning or platting stages.
Water	Inadequate	Proposed Expansion	The capacity of the system could be increased substantially by the addition or expansion of specific components. Proposals have been made to expand the system to serve 8,600 people by 1980.
Sanitation	Over Capacity	Proposed Expansion	The System is currently operating slightly over capacity. Upgrading of existing components and the addition of new treatment facilities could enlarge the system to handle 8,600 – 11,000 people by 1980.
Schools	Over Capacity	None	Classrooms are currently slightly over capacity. However, the student/teacher ratio is somewhat less than the accepted standard of 25:1. No expansions have been proposed.
Health Care	Inadequate	None	The hospital currently has some excess capacity. Given a standard of 1 doctor per 1,000 people, the area is presently slightly understaffed, since its 5 doctors serve about 6,000 – 7,000 people.
Police	At Capacity	None	By national standards of 2 policemen per 1,000 population the department is currently operating at capacity. The present police system has sufficient space for a much larger staff.
Fire	Inadequate	None	Water pressure at many residential hydrants is inadequate. A major population influx would necessitate the services of a full-time professional fire department.
Library	Inadequate	Completed in January, 1976	Though the present library is substandard in terms of volumes and space, its coordination with the county system will improve its facilities considerably.
Transportation	Inadequate	Proposed	Some through streets and highways are currently over capacity. Planned rerouting of traffic should alleviate this problem somewhat. Further major expansion would be necessitated by a major population influx.
Recreation	Adequate	None	Summer recreational opportunities are sufficient for a population 4-5 times the current level. Winter, indoor facilities are much more limited and will require expansion.
Human Services	Adequate	None	Most human services for the area are located in Grand Junction or Glenwood Springs. A major population influx to Rifle would require the addition or expansion of many programs.

CHAPTER V

HOUSING, MUNICIPAL AND HUMAN SERVICES: MEEKER

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CHAPTER V HOUSING, MUNICIPAL AND HUMAN SERVICES: TOWN OF MEEKER

A. Introduction

This chapter describes the current status of housing, municipal and human services in the Town of Meeker. Housing and the major services are examined with respect to carrying capacity, elasticity and overall conditions. Both existing conditions and planned or proposed changes are reviewed in terms of their adequacy in view of the proposed action. The information presented represents a compilation of the most recent data available at this writing. Sources of information include other studies, telephone interviews with local officials, and site visits to the area.

The Town of Meeker, while currently operating many of its services at capacity, has made significant progress toward planning for anticipated growth related to coal development near Craig and oil shale development on the Federal Test Lease Tracts. Major expansion projects of both the water and sewer systems are presently underway. The addition of the equivalent of six classrooms to the existing high school is now in progress, and construction will begin on a new junior high school in the spring of 1976.

Each of these expansions has been planned in anticipation of the increased demand for municipal services which will be generated by the new energy-related population. The foresight illustrated by the advancement of these projects is indicative of the attitude of Meeker and Rio Blanco County toward growth. Realizing that energy development in the region was imminent, the County began to formulate specific policies concerning growth management in 1974. Financed by an $80,000 planning grant from the Lessees of Federal Tracts C-a and C-b, the County contracted with the firm of James M. Bowers and Associates in the summer of 1974 to prepare a growth management plan for the County and concept plans for the Towns of Meeker and Rangely. The fundamental policies developed in the Meeker plan seek to minimize sprawl and unnecessary use of agricultural land for residential development, and to preserve the character of the existing community.

Taking advantage of federal and state funding sources, the Town of Meeker also contracted for the preparation of evaluation studies of the water and sewer systems and subsequently began construction of new modular facilities which will minimize front end costs while maximizing flexibility to respond to rapid growth.

These systems are designed to minimize problems of excess capacity in the long term once the permanent energy development induced population arrives. Comprehensive zoning regulations and land use plans also give Meeker the capability of controlling and directing growth. As depicted in the Sketch Plan (Figure V-1) land uses for the immediate area have been carefully designated. Lands available for residential development, in particular, have been chosen on the basis of overall suitability

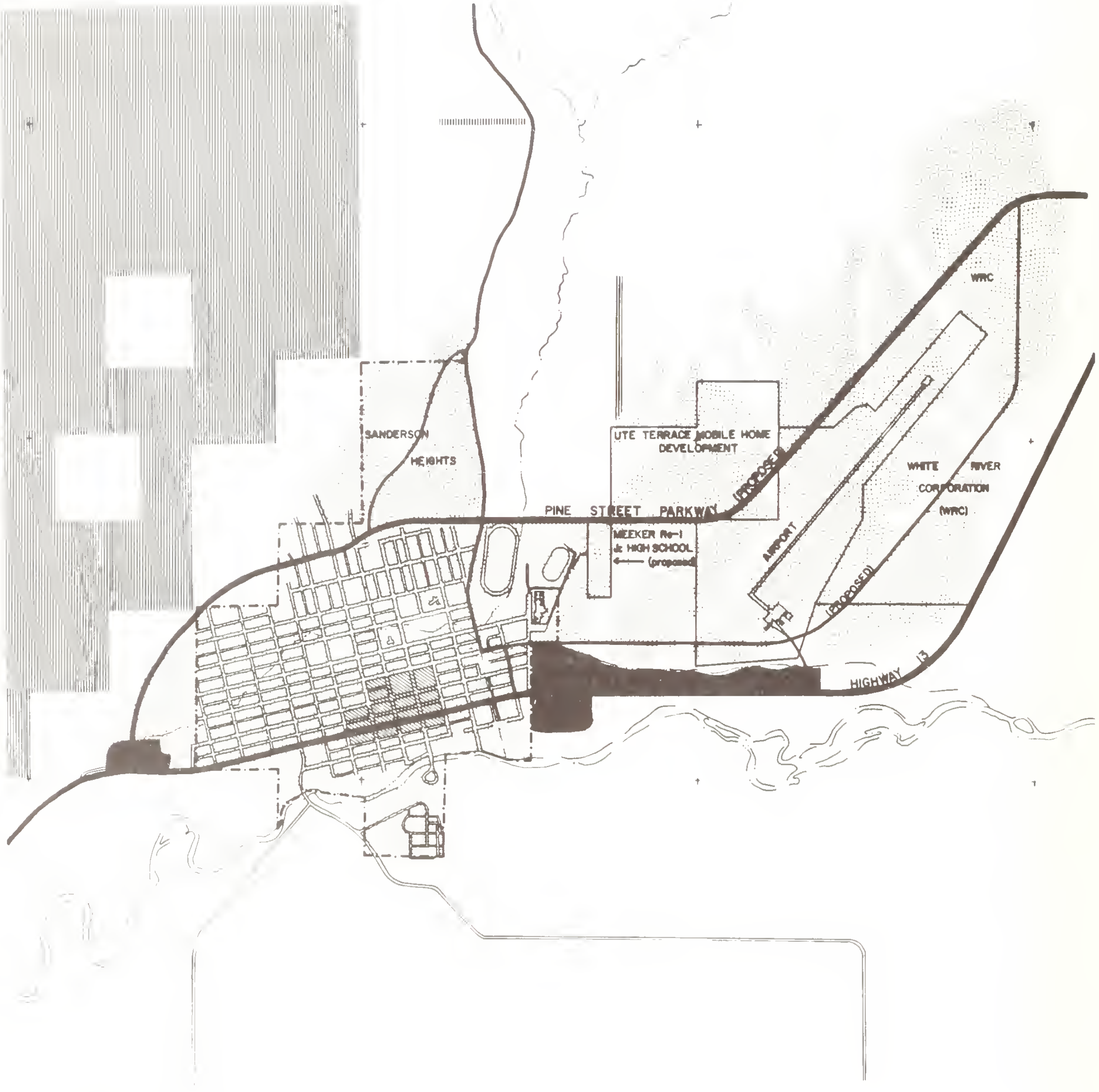

FIGURE V-1
SKETCH PLAN
TOWN OF MEEKER & VICINITY
RIO BLANCO COUNTY, COLORADO

AFTER BOWERS AND ASSOCIATES JUNE 1975

with respect to numerous environmental, economic and social criteria. The same consideration has also been given to those lands zoned for commercial development. The early planning done by Meeker and the County provides an encouraging example of how the coordinated efforts of industry and federal, state and local governments can facilitate practical planning for the orderly absorption of a major population influx.

B. Current Status of Housing

1. Housing Availability and Cost

Meeker had a total of 655 year-round housing units in 1970. At that time, single-family units accounted for 82 percent (538) of the total, while mobile homes accounted for 4 percent (28). Sixty percent (393) of the units, excluding mobile homes, were owner occupied.[1] More recent figures (1974) estimate that the total inventory increased between 1970-1974 to 739, including 580 single-family units, 60 multiple family units, 29 mobile homes and 70 unspecified vacant units.[2] Recent additions to the local housing inventory include 15-20 new homes and three fairly new apartment buildings having 12, 4 and 5 units.[3] This increase of 13 percent can be compared to a population increase of approximately 25 percent during the same period, 1970-1974.

According to local realtors, land values in Meeker average $6,500 to $7,500 for a partially improved lot lacking utilities and $7,000 to $8,000 for a fully improved lot. Rents vary from $150 to $350 per month with a newer two-bedroom apartment averaging $200 to $250 per month. Trailer pads generally rent from $70 to $100 per month, depending on quality.

The 15 to 20 new homes mentioned previously have been built in Meeker since 1974 with prices varying from $22,500 to $45,000. The majority were in the $25,000 to $35,000 range. All of these units were either custom built or sold before completion. Resale prices for houses in the area run from $30,000 to $45,000. Houses for sale remain on the market for a very short time in most cases.[4]

Construction costs for houses average about $25 per square foot, which is common for the three county region. New houses are most often frame, prefabricated or factory type units. Meeker is plagued by a chronic shortage of qualified labor and high construction costs in the face of an ever increasing demand.

Mobile home prices range from $6,600 for a 14' by 56', two-bedroom unit with utilities to $12,900 for a comparably equipped 24' by 60' unit. Construction costs for trailer parks average about $5,000 per pad for development including paved streets, curbs and gutters, recreation facil-

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[1] Bowers and Associates, 1974, p. 39.

[2] VTN, Colorado, 1975, p. 123.

[3] Goosman Realty, Meeker, Colorado, telephone interview, October, 1975.

[4] Goosman Realty, Meeker, Colorado, telephone interview, October, 1975.

Table V - 1
HOUSING INVENTORY
MEEKER

Unit Type	1970[1]	1975[2] (Estimated)
Occupied Year-Round Units:		
Single Family	538	580
Multiple Family	47	60
Mobile Homes	28	29
Vacant Units (Unspecified)	70	70
Total Units	683	739

Sources: 1. U. S. Census of Housing, 1970.
2. Goosman Realty, Meeker, Colorado, October, 1975.

Table V - 2
LAND AND HOUSING VALUES
MEEKER

Type of Property	Average Cost
Improved lot (all utilities) 70' x 150'	$ 7,000 – $ 8,000[1]
Unimproved lot (without sewer and water) 70' x 150'	6,500 – 7,500[1]
Average monthly single or multiple family unit rent	150 – 350[2]
Average monthly trailer pad rent	70 – 100[3]
Owner occupied unit median value	11,300[1]
Sales range: Used housing	30,000 – 45,000[2]
New housing	22,500 – 45,000[2]

Sources: 1. VTN Colorado, 1975, page A-76 – A-77.
2. Goosman Realty, Meeker, Colorado, October, 1975.
3. Rio Blanco County Planning Office, February, 1976.

ities, all utilities and storage space for each pad.[1] (See Tables V-1 and 2.)

2. New Housing

The only definite new development anticipated is the Ute Terrace mobile home project which will provide spaces and facilities for 400 mobile home units. Located northeast of town on property owned by Hancock and Johnston, the development is planned and has engineering studies completed. The developers own 160 acres and plan to put the 400 units on 80 of these acres. The maximum allowable density for mobile home development under county zoning ordinances is 5.5 units per acre.

The addition of 400 mobile home units would represent a 54 percent increase in the total housing inventory. Such an increase, however, will not begin to satisfy future housing demands, particularly since it is likely that many new residents will desire permanent single family units.

C. Current status of the Water Treatment and Delivery System

1. The Existing System[2]

Meeker has adequate water rights to meet present demands for water with a senior municipal water rights decree for 3.42 cubic feet per second (cfs) and additional moderately junior rights for 7.0 cfs.[3] These junior rights are subject to infrequent temporary shortages during the late summer, but shortages generally occur only about once in every 10 years. It has been recommended that Meeker acquire additional senior irrigation rights to be used for municipal use only in the event of a shortage.

The design capacity of the present treatment system is 1.6 mgd (1,700 gallons per minute). However, the poor condition of the system has reduced the effective capacity to approximately .8 mgd (650 gpm). Since current average daily demand is over 1.6 mgd, the system is now operating considerably over capacity. The system is composed of two intakes on the White River, one in Meeker and the other 8 miles upstream. Only water taken from the lower intake is treated. In winter this intake freezes completely, thus necessitating that the entire supply be drawn from the upstream intake. Water from the upstream intake is not run through the treatment plant, and is essentially raw water, although its quality is rated as fairly high. The treatment plant has been officially condemned by the EPA and continues to operate only through temporary extensions granted pending the installation of a new facility. The condemnation resulted from pollution of the White River by water treated with aluminum sulfate and soda ash which escapes from the system through overflows.

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[1] Goosman Realty, Meeker, Colorado, telephone interview, October, 1975.

[2] The Meeker water system is currently being upgraded. As such the description refers to the condition of the system in the latter part of 1975.

[3] Wright-McLaughlin Engineers, 1975.

The overflows occur at the storage tanks located on the hillside northwest of town. Two 500,000 gallon steel tanks provide storage for treated water. These tanks, which are in good condition, are continually filled with treated water pumped from the treatment plant site. Taps along the line receive water from both directions: pumped from the treatment plant site and gravity-fed from the storage tanks. The tanks are kept in a maintained overflow condition during frost periods to prevent freezing and avoid pressure build-up in the transmission line. The overflow accounts for the large discrepancy between the amount of water treated and the amount metered through taps. All taps in the municipal system are metered.

The water distribution system, although in good condition, is undersized and inadequate. The lines vary in diameter from 1" to 10" with the majority in the 2" - 4" range. Such small pipes cause significant energy loss within the system due to the amount of pressure needed to pump an adequate water supply through the line.[1] Fire hydrant flows have also been found to be insufficient because of line capacities. Hydrant flows are generally better in the business area than residential areas because of generally larger lines. This problem has given Meeker a fire insurance rating of 8.[2]

Municipal water requirements average about 200 gallons per capita per day (gpcd). Town water use varies from 300,000 gallons per day (gpd) in winter to a peak of 1.8 million gallons per day (mgpd) during the summer. Actual household water use averages about 95 gpd. A substantial amount of treated water, up to 60 percent, is returned unused to the White River as a result of overflow from the storage tanks and "bleeding" of home taps in winter to prevent freezing (see Table V-3).

2. Expansion of the Water System

A new water diversion and treatment system, designed by Wright McLaughlin Engineers of Denver is under construction with the first phase scheduled for completion in the Sommer of 1976. The new system will increase treatment capacity to 2.3 mgd in the initial phase, an amount sufficient to serve 4,500 users. Phase II will further expand capacity to 3.9 mgd which is adequate for a population of 7,850, or 3,350 additional persons. The new diversion system has been designed to alleviate the freezing problem which plagues the present system. Alluvial wells will be dug to withdraw water from the alluvium beneath the White River. The water will be naturally filtered by the soil during its extraction, thus eliminating the need for artificial filtering. Phase I will also include the addition of a third 500,000 gallon storage tank, bringing total storage capacity to 1,500,000 gallons. The distribution system will be upgraded through the

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[1] Wright-McLaughlin Engineers, telephone interview, November, 1975.

[2] Insurance Services Office, Denver, Colorado, telephone interview, October, 1975.

Table V - 3

DESIGN WATER USE PARAMETERS FOR MEEKER, COLORADO
(1974, 1990)

Type	1974 Water Use	1990 Water Use
Household Domestic Use (winter)	100 gpcd	100 gpcd
Peak Daily per Capita Use (summer)	810 gpcd	500 gpcd
Peak Monthly per Capita Use (summer)	13,600 gals/month/person	10,300 gals/month/person
Average Annual per Capita Use	200 gpcd	171 gpcd
Peak Daily EQR Use (summer)	2590 gpd/unit (1.8 gpm)	1585 gpd/unit (1.1 gpm)
Peak Hourly EQR Use (summer)	3500 gpd/unit (2.43 gpm)	2230 gpd/unit (1.55 gpm)
Peak Monthly EQR Use (summer)	43,600 gals/month/unit	33,300 gals/month/unit
Average Annual EQR Use	235,000 MG (0.72 acre-feet)	200,000 MG (.61 acre-feet)

Source: Wright-McLaughlin Engineers, 1975, page IV-10 replacement of existing smaller lines by ones averaging 8"-12" in diameter. This enlargement should vastly reduce energy loss within the system and improve the efficiency of fire hydrant operation. One objective of the expansion is to reduce Meeker's fire insurance rating from 8 to 6.

The new distribution system will eventually be expanded to encompass a service area including the land surrounding the existing airport and the Ute Terrace Mobile Home Park. Actual tap connections for the mobile home development, however, will have to be installed by the developer with the cost of the hookup to the municipal system to be met by prepaid tap fees. The new storage tank will be located at an altitude sufficient to provide gravity-fed water to the trailer park.

Phase I of the expansion will cost an estimated $1.2 million and will be operational by Fall, 1976. The system will then have the capability to serve 4,500 persons which is an increase of 2,500 persons. Financing will be provided by the Colorado Water Conservation Board, in the form of a loan of $300,000 and the Farmer's Home Administration, which will provide a combination loan-grant for the remaining $900,000.[1]

Annual operation, maintenance and replacement costs for the Phase I water system are estimated to be approximately $69,700. These costs will be met through water service income in the form of tap fees and monthly charges. Normal residential tap fees for Meeker average $850, at a 3/4" tap size, with the annual cost of water service averaging $103 per unit.[2] The 3/4" tap annual water charge is slightly higher than comparable figures for other towns in the three county area. Because of this, Wright-McLaughlin anticipates that annual operating costs and debt service costs can be met by existing revenue levels without substantially raising costs to the customer.

D. Current Status of Sanitation Facilities

The facilities of the Meeker Sanitation District are currently operating over design capacity. The present extended aeration system has a treatment capacity of 200,000 gallons per day (gpd). Average daily usage is 275,000 gpd, serving a population of approximately 2,000. Peak usage of the present system is 325,000 gpd.[3] (See Table V-4.)

The existing facility located on the edge of the White River flood plain in the southwest corner of Meeker is currently being expanded. A multi-phase expansion program, designed by Merrick and Company, will increase treatment capacity to 400,000 gpd by fall of 1976. This first expansion, Phase I, will double the service capacity to a capacity of 4,000 through the addition of a flow equalization chamber. This component balances system flows and lessens the problem of peak usage far in excess of the average usage. Phases II and III, for which prelimin-

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1. Wright-McLaughlin Engineers, telephone interview, November, 1975.

2. Wright-McLaughlin Engineers, 1975, pages VIII/3 - VIII/6.

3. Merrick and Company, 1974.

Table V - 4

SEWAGE TREATMENT FACILITIES SUMMARY AND ESTIMATED FUTURE COSTS FOR MEEKER

(1975 and unscheduled estimates)

MEEKER

Year	Population Capacity	Treatment Capacity (gpd)	Scheduled Improvements	Estimated Costs (1975 $)
1975	2,000	200,000		
Phase I (complete – Summer 1976)	4,000	400,000	Addition of: 200,000 gal. aeration basin flow equilization chamber tertiary treatment unit.	$ 960,000
Phase II (unscheduled)	8,000	800,000	Change from extended aeration process to complete mixed activated sludge process. Increase capacity of all components.	475,000
Phase III	12,000	1,200,000	Increase overall system capacity.	700,000

Source: Merrick and Company, October, 1975.

ary engineering studies have been done, will increase the treatment capacity in two steps to 1,200,000 gpd, accommodating a total population of 8,000 and 12,000 persons respectively. No timetable for the implementation of Phases II and III has been determined[1], since it is anticipated that expansion would proceed according to need.

All expansions will utilize the existing site and facilities. The system will continue to be an extended aeration process through Phase II, but will be improved through the addition of new components including flow equalization chambers, covered treatment components, and relocated inlet pipes. These improvements will not only increase treatment capacity but will also mitigate present and potential environmental degradations including odor problems and system overloads which result in the release of partially treated effluents into the White River. Phase III will convert the system to a complete mixed activated sludge process which is more suitable for a larger community. A further advantage of the extended aeration process is that it requires the least electricity of any of the alternative treatment methods.[2]

Estimated costs of the Phase I expansion of the sanitation system are approximately $900,000. Financing is being provided by grants from the Environmental Protection Agency, the Colorado Department of Health and a $200,000 General Obligation Bond. The bond is held by the Meeker Sanitation District and is intended to be retired through net income from sewer system service and connection charges. The total project cost is being funded 80 percent by EPA and the Colorado Department of Health and 20 percent by the district.[3]

The sewage collection system, built in 1962, is in generally good condition, with no major renovation or expansion anticipated. The addition of sewer service to new developments within the Sanitation District, however, would necessitate the construction of collection lines linking the new service areas to the existing system.

The expanded system is only designed to serve the present service area, which does not include the new Ute Terrace Mobile Home Park. Utilities, including sewage, within this development will be engineered and built by firms under contract to the developer. However, they must be connected to the municipal sewage system under the town zoning ordinances. The municipal sewer expansion has been planned so that the new development joins a major collection line at a point on the boundary of the municipal service area. It is expected that the developers of Ute Terrace will pay about $200,000 in advanced service fees to finance the necessary tie-in with the municipal system.[4] Such an agreement can be expected to characterize future developments also.

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1. Merrick and Company, telephone interview, November, 1975.

2. Merrick and Company, 1974.

3. Merrick and Company, telephone interview, November, 1975.

4. Merrick and Company, telephone interview, November, 1975.

E. Current Status of Schools

The Meeker area is served by one school district, Meeker Re-1, which includes two elementary schools, one junior high school and one high school. One elementary school, the Rock School, is located in the Piceance Creek area. The other three schools are all in the town of Meeker. Rio Blanco County is served by two school districts, Meeker Re-1 and Rangely Re-4. The Meeker Re-1 School District serves approximately two-thirds of Rio Blanco County.

Total enrollment for Fall, 1975 was approximately 700 students (with a closing enrollment of 697), including 358 elementary students, 100 junior high students and 246 high school students (see Table V-5). There were 45 certified staff members in 1974-75 for an average pupil/teacher ratio of 15.1/1.[1] This is a fairly low ratio by accepted standards of 25 students per teacher.[2]

Meeker's schools have a total of 44 classrooms with an average pupil/room ratio of 15.6 (1974-1975). The three main schools themselves (excluding Rock School) have an official combined capacity of 750. With the Fall, 1975 enrollment, both the elementary school and high school are operating very near capacity. The new enrollment associated with normal population growth will undoubtedly surpass the optimum size in the near future. The junior high school was over capacity during the 1975-1975 school year. Although during the current year it is somewhat under capacity, the building itself is very old and in need of improvements.

Plans have been made for the construction of a new junior high school. A bond election in November, 1975 will seek acceptance of a $950,000 school bond which combined with Oil Shale Mineral Lease Fund monies will provide financing for the project. Depending on the acceptance of the bond and the availability of the Lease Fund monies, the new junior high school will have a capacity of 250-400 students. Twelve acres of land has already been purchased for the new school site at a price of $60,000.

If the junior high school is built the added capacity might be used, in part, by transferring the 5th and 6th grade classes either to the new junior high school or the old one. Such a plan would temporarily alleviate the shortage of classroom space in the elementary school. It is projected, though, that given any significant local population growth a new elementary school will be needed within the next five years.

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1. Information about the Meeker School District was given by Office of the Superintendent, Meeker School District, Re-1, in a telephone interview, October, 1975.

2. Office of the Governor of Colorado, IMPACT, 1974, p. III/A/148.

Table V - 5

ENROLLMENT CAPACITY, NUMBER OF TEACHERS AND STUDENT-TEACHER RATIOS IN MEEKER SCHOOLS

(Meeker School District Re-1)

School	Current Student Enrollment	School Capacity	Number of Teachers	Student/ Teacher Ratio
Elementary	332	350	17	19.5/1
Junior High	100	150	8	12.5/1
High School	245	250	15	16.4/1

Source: Meeker School District Re-1 Officials, October, 1975.

The high school was designed using a modular expansion system which would permit expansion from the present 250 to 440 students. Application has been made for Oil Shale Mineral Lease Funds to build additional classrooms. Each classroom wing could accommodate another 75 students at an estimated cost of $95,000 per wing. No action has yet been taken on the request for funds.

F. Current Status of Health Services

The Meeker area is served by Pioneer Hospital which offers a licensed 17 bed hospital and 25 bed nursing home. The facilities serve approximately 2,500 people and could serve an additional 2,200 more, according to the hospital administration. The hospital is county owned and the nursing home, although owned by the town, is operated by the county under a long-term lease.

In-patient utilization of the hospital averages less than 30 percent of capacity with only 1,600 in-patient days recorded in 1974. The average number of patients served per day is 4.5. The nursing home is operating near capacity with an average of 24 patients per day being cared for, and a total of 9,000 in-patient days recorded for 1974.[1]

The facilities are staffed by a team including 2 general practitioners, 1 dentist, 8 registered nurses and 7 licensed practical nurses. These specialists visit the hospital on a regular basis: a pathologist, a radiologist and a cardiologist.

Using the state standard of 2.45 beds per 1,000 population, Pioneers Hospital could serve a total of about 7,200 persons.[2] Standards for the ratio of population to doctors vary widely, from the national average of 627:1 to 1,652:1, an average figure calculated for 131 energy impacted communities.[3] The current Meeker ratio is about 1,200:1 and hospital officials report that the number of doctors is currently adequate. Unlike many small rural communities, Meeker has a very stable history of medical service with both of the present doctors having been there for many years.

Although the present medical facilities are operating somewhat under capacity, excluding the nursing home, any large influx of population would necessitate the services of approximately one new doctor per 1,000 new residents.

G. Current Status of Utilities[4]

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1. Pioneers Hospital Administration, telephone interview, October, 1975.

2. Bureau of Land Management, 1975, p. 348 (based on Colorado Department of Health, 1975, p. A-57).

3. Mountain Plains Federal Regional Council, 1975, p. 5.

4. The data in this section were obtained in conversations with representatives of the Public Service Company of Colorado, The Western Slope Gas Company, and The Greeley Gas Company, 1975.

Utilities, specifically gas and electricity, are provided to the communities in the region through a statewide system. The nature of this system, known as an interchange, precludes the possibility of identifying sources and capacities for specific towns. The amount of gas and electricity generated by individual plants can be determined, as can the total amount of each commodity sold in a given region. In addition, the general capacities which can be delivered to certain areas can be broadly defined by identifying the limiting factor in the system, most frequently the transmission line capacity. Thus, discussion of the demand for and availability of power must be regional rather than site-specific in scope.

Gas and electricity for Meeker are provided by Greeley Gas Company and the White River Electric Association which buys electricity from Colorado-Ute Electric Association. Public Service Company electricity generating stations, which serve the three county area, are Cameo, generating 79 megawatts (MW), Shoshone (12.5 MW), and Fruita (25 MW). The Colorado-Ute generating stations are Nucla (39 MW) and Hayden #1 (180 MW). Virtually all new residential and commercial buildings in the Western Slope region use natural gas for heating purposes. The majority of buildings use natural gas.

Gas supplies of both PSC and Greeley Gas come primarily from local wells either operated by the companies or independently owned. Electrical transmission lines, although individually owned by the various suppliers, are used on a cooperative basis. The main lines serving the region are a 230 Kilovolt (kv) line from Cameo to Denver, a 69 kv from Glenwood Springs to Grand Junction, and a 230 kv line, owned by the Bureau of Reclamation, from Rifle to Hayden. The kilovolt designations refer to the carrying capacity of the line, and it is this which places an effective limitation on the amount of electricity which can be provided to a particular service area at any given time.

Although specific data on the amount of power consumed in the region is not available, the suppliers state that they have sufficient capabilities to meet present and future demand based on normal growth rates. An indication of this surplus is the fact that Colorado-Ute, with a 360,000 kilowatt capacity in 1974, experienced a peak demand of only 258,000 kw in that year. White River Electric Association, serving Meeker, purchased 62 million kilowatt hours of electricity from Colorado-Ute in 1974.

Gas supplies for the region, however, are not as plentiful as electricity. Although the major suppliers report that they have sufficient quantities to meet current demand, new sources are becoming increasingly hard to acquire as the demand for gas increases. Spokesmen for the major supplying companies report that with adequate lead time they will be able to meet the increased demand from residential and commercial growth. They emphasized, however, that the lead time provided by orderly rather than sudden and unpredicted growth will be vital to the timely expansion of their systems of supply.

As mentioned, the standard policy of the power suppliers is to plan only for demand based upon normal growth. The capital costs involved in the construction of power plant facilities prohibit speculative expansion. The major suppliers feel confident that they will be able to accommodate the future demands of energy-related population growth through the flexibility provided by the statewide interchange system. Officials of Public Service hasten to add, however, that this ability to meet increased demand does not include the provision of power to fuel the oil shale plants themselves.

Two major power generating plant projects are now under construction in northwestern Colorado, Hayden Station #2, and Yampa Project. Both are cooperatively owned projects in which the power generated will be shared among the owners, some of whom are out-of-state suppliers. By 1982 the Hayden plant will supply 125 megawatts of electricity to the Colorado-Ute service area. The Yampa Project will increase the Colorado-Ute system capacity by another 220 megawatts by 1980. Again, these projects are being built solely on the basis of normally increasing demand.

Considering the substantial lead time necessary to expand present electricity generating plants, the possibility of short-term power shortages would certainly seem to exist. In summary, given the necessary lead time for expansion, the provision of power should not pose any serious limitation upon residential or commercial development.

H. Current Status of Transportation

Meeker is served by two state highways which intersect approximately one mile west of the town limits. State Highway 13 runs north-south from Craig to Rifle while State Highway 64 runs from Meeker west to Dinosaur. In addition, the town is served by numerous county roads and approximately 14.5 miles of town streets.[1]

No major street or road construction projects are planned for the Meeker area. A sufficiency report prepared every two years by the Colorado Department of Highways has found State Highways 13 and 64 in the Meeker area to be in good condition. While both are rated poorly on smoothness, the overall sufficiency ratings, based on smoothness, width, and safety factors are good to excellent.[2] The town of Meeker would like to begin a four-year project of seal-coating the streets, but is experiencing difficulty in obtaining financing. The Town also would like to build two small bridges connecting streets in Meeker which are currently dead-end and is also seeking financing for this project.[3]

The increased traffic volume associated with a major population increase in Meeker would most likely hasten deterioration of the existing roads, thus necessitating more frequent maintenance and possibly upgrading.

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1. Meeker Town Manager, telephone interview, October, 1975.

2. Colorado Department of Highways, telephone interview, October, 1975.

3. Meeker Town Manager, telephone interview, October, 1975.

I. Current Status of Police Protection

Meeker's police department consists of one chief and two patrolmen. Two vehicles are owned by the department. The department is currently operating over capacity according to generally accepted standard ratios of policemen to population served.[1] Even with the addition of one more patrolman the department would still be slightly understaffed. Office space is also inadequate at the present, although a planned expansion of the city hall would provide more space.

The town of Meeker is a small, fairly close-knit old community with a rather minimal crime problem. An influx of new residents no doubt would be accompanied by some proportional rise in crime and thus necessitate a higher level of law enforcement.

J. Current Status of Fire Protection

The town has a 30-man volunteer fire department and five fire equipment vehicles. These include two equipment trucks and three pumpers. The total pumping capacity of the trucks is about 1,000-1,225 gpm, which is slightly substandard for a town of 2,000 people.[2] Also, fire hydrant efficiency is poor because of small diameter service lines. The new water system which is currently being constructed will greatly improve the operation of the hydrants. Meeker's fire insurance rating is presently 8, which is about average for communities of that size and type.[3] It is hoped that the improved water system might lower the rating to 6.

There is already a need for additional fire equipment, especially considering that the department is also responsible for covering the entire eastern half of the county. Significant population growth would require a substantial increase in both manpower and equipment.

K. Current Status of Library Facilities

Meeker has a relatively new library containing about 9,000 volumes. The library serves the entire eastern portion of Rio Blanco County. The building has approximately 4,500 square feet of floor space. Assuming that the Meeker library serves the entire population of Meeker and the residents of surrounding rural areas, the total population served is about 3,000 people. Given a standard of 3.5 - 5 books per capita and .7 - .8 square feet per capita, Meeker's library is adequate in terms of space but inadequate in terms of number of volumes.[4] The library could accommodate a population increase, in terms of the present floor space, but it would necessitate the addition of 8,000 new volumes to the present collection.

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[1] VTN, Colorado, 1975, p. A-85.

[2] Meeker Town Manager, telephone interview, October, 1975.

[3] Insurance Services Office, Denver, Colorado, telephone interview, October, 1975.

[4] De Chiara, 1975, p. 7

L. Current Status of Recreational Facilities

Recreational facilities in Meeker include a 5 acre park with playgrounds, a swimming pool, camping, fishing and picnicking in addition to the town park. The Meeker School District also has a total of 16.5 acres of land for recreation activity. This includes sport fields, playgrounds and 2 tennis courts. The Rio Blanco County Fairground is also located in the town of Meeker. Other recreational facilities in the area include a 20 acre, 9-hole golf course, scheduled for expansion, and a 5 acre trap and target shooting range. There is also a 24 acre outdoor recreation area near Meeker offering camping, fishing, boating and picnicking.[1] Other major recreational areas near Meeker include 1 National Forest, 1 National Monument, and 1 Wilderness Area.

The total number of acres of recreational lands in and around Meeker would be difficult to calculate because of the large amount of government-owned public land which could be included. Generally it would seem that the Meeker area has outdoor recreational facilities sufficient for a population much larger than that which currently exists. Year-round, indoor facilities are limited, and the addition of such amenities as a theatre and public gymnasium would be a significant asset.

M. Human Services in Meeker

Meeker offers a range of welfare and food stamp services in the town. There is a public health nurse who works half-time in Meeker and half-time in Rangely. The mental health office is a branch of the Colorado West Regional Mental Health Center located in Glenwood Springs. The office makes available individual and group services.

There are presently no transportation services available for the elderly, although there is a very small "Meals on Wheels" program. A 24-unit housing development is available for elderly residents. Many elderly persons use the 32-bed nursing home connected with Pioneer Hospital. No other housing is available specifically for the elderly.

No special education services are provided in the school system. Students with developmental disabilities and people needing physical rehabilitation are generally cared for in Glenwood Springs or Grand Junction.

Juvenile corrections and adult corrections services are also provided in Glenwood Springs and Grand Junction.

There are approximately 12 churches and one privately-owned cemetery in Meeker.

Significant increase in the population would require the location of additional human services within Meeker and expansion of the programs offered, especially in view of the adjustment problems which traditionally accompany rapid growth and conditions of temporary settlement.

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1. VTN, Colorado, 1975, p. 133.

N. Summary

A summary of services for Meeker is presented in Table V-6 on the following page, which cites the type of service, its current status, any scheduled improvements for the service, and comments on current data available about the services.

Table V - 6

MEEKER – SUMMARY OF SERVICES

Service	Current Status	Improvements	Remarks
Housing	Inadequate	Planned Mobile Home Park Development	The current housing inventory is inadequate to meet demand. Construction will begin on a new mobile home park in 1976, eventually providing 400 spaces.
Water	Inadequate	Under construction – completion date: Fall, 1976.	The new water system, built on a modular design, will serve 4,500 people by fall of 1976. Eventually the system will be able to serve 7,850 people after Phase II is completed.
Sanitation	Over Capacity	Under construction – completion date: Fall, 1976.	The new sewage system will be able to serve 4,000 people by fall of 1976 with the ultimate capacity, after a 3 phase expansion, being 12,000 people.
Schools	Near Capacity	Planned construction of new Jr. High School and expansion of High School	The Jr. High School is scheduled for completion in May, 1977. Expansion of the High School will be completed by summer, 1976. Substantial funding for these projects has come from the Minerals Lease Fund.
Health Care	Adequate	None	The hospital is operating considerably below capacity and could handle a population of about 7,200. According to the standard population: doctor ratio of 1000/1 the number of doctors is slightly substandard.
Police	Over Capacity	Planned office space expansion.	The department is presently understaffed, having only 3 policemen. The addition of 2 policemen per 1,000 population would be necessary to keep the force up to accepted standards.
Fire	Inadequate	Water system expansion will improve hydrant efficiency	The total pumping capacity is somewhat substandard. A major population influx would require additional equipment and possibly the services of a full-time professional department.
Library	Inadequate	None	Although the relatively new library is large enough to serve about 5,600 people, the number of volumes is insufficient to serve the present population.
Transportation	Adequate	None	A recent State Highway Department study showed all state roads to be in good condition. Municipal roads and streets are also adequate.
Recreation	Adequate	None	Summer recreational facilities are sufficient for a large population increase. Winter, indoor facilities are more limited and would require considerable expansion.
Human Services	Adequate	None	Most human services for the area are located in Grand Junction or Glenwood Springs. A major population influx to Meeker would require the addition or expansion of many programs.

CHAPTER VI

DEMAND AND COST IMPACT PROJECTIONS FOR HOUSING, MUNICIPAL AND HUMAN SERVICES

CHAPTER VI DEMAND AND COST IMPACT PROJECTIONS FOR HOUSING, MUNICIPAL AND HUMAN SERVICES

A. Introduction

This chapter provides overall demand and cost estimates for the expansion of municipal services required for the incoming population. The objective of this analysis is to estimate the total need and cost of services and the per capita cost for the new population, including both direct employees and their families and the induced service population. This approach offers an overview of the total cost of providing for the new population.

Projections of housing demand are presented and estimates of costs are evaluated. These costs, however, are not included in the overall assessment of municipal service costs resulting from the project because it is assumed that they will be absorbed by the incoming population.

The estimates of service demands are based on national and regional standards for specific increments of population increase, usually 1,000 people. Cost estimates fall into two major categories: one time front-end costs for initial expansion and routine maintenance and operation expenses. One time costs include growth planning and management, site aquisition and development, capital construction and equipment. Continuing costs include operation, maintenance and governmental costs.

The overall, long-range cost of community development is significantly influenced by whether the new population is accommodated through expansion of existing infrastructure, new town development or sprawl. New town development is substantially more expensive than expansion of existing municipalities and sprawl is considerably more costly than concentrated, well planned growth. These differences are noted in the analysis.

National cost standards are used as the basis for many of the estimates provided here. Whenever possible, however, actual costs based on specific, planned expansion of facilities in the existing communities near the Tract have been used to provide as realistic an estimate as possible of local costs. The actual costs of community development in practice will depend on which settlement scenario is implemented (see Chapter III), but the costs offered here are useful as estimates of the overall and per capita, non-site specific community development costs of the proposed action for northwestern Colorado.

All costs are given in 1975 dollars. In most cases capital costs were available for 1973 and were escalated to 1975 dollars by 15 percent per year to account for inflation. Operations and maintenance costs were escalated to 1975 dollars by 8 percent per year.

Sources for this chapter include other studies of the oil shale region, urban planning and design guides; and construction, housing and infrastructure cost estimate handbooks. In addition, numerous telephone and personal interviews were conducted with authorities on the administration of municipal and human services, and representatives of planning and engineering firms.

Two sources have been of special importance. For national standards The Costs of Sprawl has been used. This study, prepared for the Council on Environmental Quality in 1974, presents a detailed cost analysis for all types of municipal services for both neighborhoods of 1,000 units and communities of 10,000 units. Costs presented in this chapter represent an extrapolation from The Costs of Sprawl estimates to a population of 10,000 persons. Per capita costs are also determined using a 10,000 person population base.

One of the purposes of The Costs of Sprawl study was to determine the relative costs of six different types of community development.

Three of the types are described below:[1]

> "-Low density sprawl: The entire community is made up of single family homes, 75 percent sited in a traditional grid pattern and the rest clustered. Neighborhoods are sited in a 'leapfrog' pattern with little contiguity. This represents the typical pattern of suburban development.
>
> - Combination mix: This community consists of a housing mix of 20 percent each of the five types of dwellings, (1) single family homes, conveniently located; (2) single family homes, clustered; (3) townhouses; (4) walkup apartments; and (5) apartments, six stories half located in planned unit developments, half in traditional subdivisions.
>
> - High density planned: In this community, housing is composed of 40 percent high rise apartments, 30 percent walkup apartments, 20 percent townhouses and 10 percent clustered single family homes. All of the dwelling units are clustered together in contiguous neighborhoods, much in the pattern of a high density 'new community.' "

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1. Real Estate Research Corporation, 1974, p. 2

Their conclusions regarding the economic costs are presented below:[1]

> " Economic Costs: In terms of total investment costs, the high density planned community is distinctly lower: 21 percent below the combination mix community and 44 percent below the low density sprawl community. Most of these savings result from differences in development density - savings of about 3 percent of total development costs result from better "planning," whereas those from increased density amount to 41 percent. The largest cost savings are in construction of residential dwellings, although important savings are attributable to reduced costs for roads and utilities, which are about 55 percent lower in the high density than in the low density community."
>
> "'Planning' is used in a very limited sense to mean increased clustering or compactness of development. Good planning includes much more than just clustering and may well result in more significant cost savings than those indicated here."

For purposes of the analysis in this chapter the combination of 50 percent PUD/50 percent sprawl is most often used in comparison with the low density sprawl situation.

The second source referred to frequently has been the Colorado West Area Council of Governments Report; Oil Shale and the Future of a Region, Garfield, Mesa and Rio Blanco Counties, Colorado, Summary Report, September, 1974. This report represents the final synthesis of many studies prepared for CWACOG and can be considered the authoritative source for information on the area. Where cost estimates presented in this report differ from CWACOG estimates they are discussed in the text.

B. Housing Projections and Costs

1. Housing Projections

The assumptions underlying the housing projections are as follows:

Mobile Homes: 75 percent of the construction employees were assigned to mobile homes. Fifteen percent of the mining and operations staff of the project and 30 percent of the induced service employees were assigned to mobile homes.

Permanent Housing: Ten percent of the project's construction employees were assigned to permanent housing, while 85 percent of the mine and operation employees and 30 percent of the induced service workers were assigned to permanent housing.

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[1] Real Estate Research Corporation, Executive Summary, 1974, p.3.

Fifteen percent of the construction employees and 40 percent of the induced service workers were not assigned to either because their spouses were counted in on the two previous categories or because they are single, doubling up with other employees.

Further, among construction workers living in permanent housing, 60 percent have been assigned to single family housing and 40 percent to multi-family housing. Among operating and service employees, 67 percent of those living in permanent housing units have been assigned to single family units and 33 percent to multi-family units.

These ratios have been applied in this analysis for the life of the project, and can only be interpreted in the abstract to be modified by local government and industry policy decisions as well as the preferences of project employees and service workers.

These housing assignments are consistent with those developed by the Denver Research Institute's study of Sweetwater County,[1] the THK study of oil shale impact[2] and in-house projections.

Table VI-1 presents the housing requirements based on these assignments for the total population induced by the project.

2. Housing Costs

Costs of housing for a total C-b Tract induced population, based on a 50-50 split between Rifle and Meeker are presented in Tables VI-2 and VI-3. Figures presented are slightly below national figures. The average cost for single family houses is $40,200; for multi-family houses is $21,505; and for mobile homes is #13,510.

It cannot be assumed that all housing needed will in fact be built. If, however, current growth in the two towns continues at its current rate then the excess single and multi-family housing will no doubt be absorbed by this normal growth population.

Excess mobile homes after the construction phase could be replaced if some form of subsidy were available either from industry or government.

Alternatives to mobile homes are some form of temporary efficiency housing. These have been estimated at $5,000/unit. If appropriate design were considered these units could be converted to other uses after the construction phase. Such uses include housing for the elderly and commercial space.

Housing costs are not included with the costs of municipal facilities but will be compared at the conclusion of this chapter.

Total peak housing costs for Rifle and Meeker combined are estimated at:

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[1] Gilmore, 1974, Appendix p. 47.

[2] THK Associates, 1974, p. 9.

Table VI - 1

PROJECTED HOUSING REQUIREMENTS FOR THE TOTAL INDUCED POPULATION OF THE C-b OIL SHALE FACILITY

Development Stages	Year	Cumulative Years	Total Number of Housing Units	Total Single Family	Total Multi-Family	Total Mobile Homes	Additional Single Family Housing Needed	Additional Multi-Family Housing Needed	Additional Mobile Homes Needed
Phase I	1	1	–	–	–	–	–	–	–
Mine D	2	2	497	96	51	349	96	51	349
Development	3	3	458	94	50	314	(2)[a]	(1)	(35)
	4	4	77	40	20	18	(56)	(31)	(331)
	5	5	77	40	20	18	(56)	(31)	(331)
Phase II	1	6	906	176	94	636	80	43	287
Plant	2	7	2,570	528	280	1,762	352	186	1,126
Construction	3	8	4,868	1,023	540	3,305	495	260	1,543
	4	9	4,464	979	514	2,970	(44)	(26)	(335)
Phase III	1	10	2,120	795	398	927	(228)	(142)	(2,043)
Operation	2	11	2,077	951	470	656	(72)	(70)	(271)
	3	12	2,077	951	470	656	(72)	(70)	(271)
	4	13	2,077	951	470	656	(72)	(70)	(271)
	5	14	2,077	951	470	656	(72)	(70)	(271)
	6	15	2,133	977	483	674	(46)	(51)	(253)
	7	16	2,176	996	492	687	(27)	(48)	(240)
	8	17	2,193	1,004	496	692	(19)	(44)	(235)
	11	20	2,227	1,020	504	703	(3)	(36)	(224)
	22	31	2,227	1,020	504	703	(3)	(36)	(224)

Note: a. Parentheses represent excess units.

Table VI - 2

PROJECTED HOUSING DEMANDS AND COSTS IN THE RIFLE AREA

			Single Family			Multi-Family			Mobile Homes			
Phase	Year	Cumulative Years	Units	Cost	Total	Units	Cost	Total	Units	Cost	Total	Total
Phase I	2	2	48	$39,550(a)	$ 1,898,400	226	$21,505(b)	559,130	175	$13,510(c)	$ 2,364,250	$ 4,821,780
Phase II	3	8	512	39,550	20,249,600	270	21,505	5,806,350	1,652	13,510	22,318,520	48,374,470
Phase III	11	20	510	39,550	20,170,500	252	21,505	5,419,260	351	13,510	4,742,010	30,331,770

Notes:
(a) Assumes a 1,300 square foot house at $25. per square foot, a tap and improvements fee of $1,550. and a site acquisition cost of $5,500.
(b) Square foot costs are taken from Robert Snow Means Company, Inc., 1975. Assumes 1,100 square feet per unit, structure only, at $19.55/square foot.
(c) This estimate assumes construction costs of $5,000/pad, 1 - $7,100 trailer and 1 - $1,410 tap fee.

Source: Based on housing and manpower estimates made by C-b staff.

Table VI - 3

PROJECTED HOUSING DEMANDS AND COSTS IN THE MEEKER AREA

			Single Family			Multi-Family			Mobile Homes			
Phase	Year	Cumulative Years	Units	Cost	Total	Units	Cost	Total	Units	Cost	Total	Total
Phase I	2	2	48	$40,850[a]	$ 1,960,800	26	$21,505[b]	$ 559,130	175	$13,450[c]	$2,353,750	$4,873,680
Phase II	3	8	512	40,850	20,915,200	270	21,505	5,806,350	1,652	13,450	22,219,400	48,940,950
Phase III	11	20	510	40,850	20,833,500	252	21,505	5,419,260	1,652	13,450	22,219,400	48,472,160

Notes:
(a) Assumes a 1,300 sq. ft. house at a construction cost of $25. per square foot, tap and improvements fee of $1,350 and a $7,000 site acquisition cost.
(b) The cost per square foot is based on Robert Snow Means, 1975, assuming an 1,100 square foot apartment at $19.55/square foot.
(c) Assumes construction costs of 1 - $5,000 pad, 1 - $7,100 trailer and 1 - $1,350 tap fee.

Source: Based on housing and manpower estimates made by C-b staff.

	Housing Costs Rifle and Meeker Combined
Phase I	$ 9,164,110
Phase II	$ 100,889,940
Phase III	$ 59,643,200

C. Municipal Services Costs

1. Transportation

a. Roads and Streets

The requirements for and costs of roads and streets vary greatly with population density, population mix, degree of sprawl and geographical location. The numbers used in this section are based on estimates for two types of development patterns: 50 percent PUD/50 percent sprawl and 100 percent sprawl.[1] The CWACOG study[2] estimated a need for 18.55 total acres of streets per 1,000 persons or a total cost estimate of $1,368,000 (in 1973 dollars). In The Costs of Sprawl another total residential expenditure estimate of $902,067 per 1,000 persons is provided.[3] Escalated to 1975 dollars this estimate becomes $1,192,984 for residential streets including three acres of expressway in the development pattern of 50 percent PUD/50 percent sprawl. The figure for low density, 100 percent sprawl is $1,521,462 per 1,000 in 1975 dollars. Per capita estimates based on these figures range from $1,193 per capita in the former case to $1,521 in the 100 percent sprawl development pattern.

b. State and County Highways

State and county highway capital costs resulting from an oil shale industry of 350,000 bbl/day are estimated at $98,725,000.[4] One seventh of this cost assigned to C-b would result in a total per capita cost of $2,246 for a population of 6,280. Recent contracts let for the Piceance Creek Road suggest that these figures have remained stable through 1974 and 1975. Maintenance costs for highways are estimated at $87.19.[5] (see Table VI-4).

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1. Real Estate Research Corporation, 1974, pages 113-114.

2. Colorado West Area Council of Governments, 1974, p. 34.

3. Colorado Department of Highways, Office of Accounting, telephone communiciation, October 29, 1975.

4. Office of the Governor of Colorado, IMPACT I, 1974, p. I/B/20.

5. Colorado West Area Council of Governments, 1974, p. 35. These figures are averages for Garfield and Rio Blanco Counties escalated from 1973 dollars to 1975 dollars at 8 percent per year.

Table VI - 4

PROJECTED TRANSPORTATION REQUIREMENTS AND ESTIMATED ROAD AND STREET COSTS

(Base Population 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
Municipal Streets and Roads[1]	$ 11,930,000.00
County and State Roads[2]	22,460,000.00
TOTAL INITIAL CAPITAL COSTS	$ 34,390,000.00
TOTAL CAPITAL COSTS PER CAPITA	$ 3,439.00
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Municipal, County and State[3]	$ 871,900.00
TOTAL OPERATION AND MAINTENANCE PER CAPITA	$ 87.19

Sources:

1. This estimate is extrapolated from the development profile designated 50% sprawl, 50% P.U.D. in Real Estate Research Corporation, 1974, pages 113-114.
2. Office of the Governor, Impact, I, 1974, page I/B20.
3. Colorado West Area Council of Governments, September, 1974. These estimates are averages of costs in the three counties escalated from 1973 dollars to 1975 dollars at 8% per year.

2. Schools

a. School Children and School Room Requirements

Table VI-5 presents projections for total school children resulting from the project. Family units are assumed to have 1.18 school age children. This number represents the sum of .2 nursery school children, .54 elementary school children, .22 junior high students and .22 high school age students. Classroom requirements were calculated at 25 students per room. Table VI-5 shows the number of school children per grade category as well as school room requirements for the total population induced by the proposed project.

During plant construction, Phase II, 179 classrooms will be required. However, during operations the demand for classrooms will be at 90 from this population. Whether the towns will be able to utilize the excess classrooms will depend upon the normal rate of growth and the settlement patterns in the area, as well as the additions of families coming in as a result of other industry activity.

b. Elementary, Junior and Senior High School Costs

Detailed costs are presented in Table VI-6. CWACOG also estimates new annual operating expenditures for Rio Blanco and Garfield Counties at $357 and $202 per capita respectively in 1973 dollars.[1] These figures, escalated to 1975 dollars at eight percent per year and averaged, yield a per capita cost of $326. These figures are similar to estimates presented in Table VI-6.

School transportation costs can be estimated at 10 percent of the students being bused for a 50 percent PUD/50 percent sprawl situation, and 33 percent of the high school students and 25 percent of the elementary students being bused for a low density sprawl situation. Cost per bused student is estimated at $42 in 1975 escalated at 15 percent per year from the The Costs of Sprawl 1973 estimate of $32 per bused student.[2]

c. Nursery School Costs

Nursery school operation and maintenance costs are assumed to be $60/month per pupil for nine months. Costs are detailed in Table VI-6.

d. Vocational-Technical Programs

Vocational-technical programs could provide an important means for preparing local people for jobs in industry thereby reducing external demand and perhaps lowering turnover rates. Such programs might also provide an education for people who have or may become dropouts, an opportunity for entertainment or the chance to learn new skills for adults

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[1] Colorado West Area Council of Governments, 1974, p. 35.

[2] Real Estate Research Corporation, 1974, pages 110-111.

Table VI-5
PROJECTED SCHOOL CHILDREN AND SCHOOL ROOM REQUIREMENTS FOR THE TOTAL POPULATION INDUCED BY THE C-b OIL SHALE FACILITY

Development Stages	Year	Cumulative Years	Number of[a] Families	Nursery	Elementary	Junior High	High School	Total Children	Nursery Classrooms	Elementary Classrooms	Junior High Classrooms	High School Classrooms	Total Classrooms Needed Per Year	Total Incremental No. of Classrooms Needed
Phase I	1	1	–	–	–	–	–	–	–	–	–	–	–	–
Mine	2	2	354	71	191	70	78	418	5	8	3	3	19	19
Development	3	3	328	66	177	72	72	387	4	7	3	3	17	(2)[b]
	4	4	62	12	33	14	14	73	1	1	1	1	4	(15)
	5	5	62	12	33	14	14	73	1	1	1	1	4	(15)
Phase II	1	6	649	130	350	143	143	766	9	14	6	6	35	16
Plant	2	7	1,813	363	979	399	399	2,140	24	39	16	16	95	60
Construction	3	8	3,403	681	1,838	749	749	4,016	45	74	30	30	179	84
	4	9	3,133	627	1,692	689	689	3,697	42	68	28	28	166	(13)
Phase III	1	10	1,575	315	851	347	347	1,859	21	34	14	14	83	(83)
Operation	2	11	1,585	317	856	349	349	1,870	21	34	14	14	83	(83)
	3	12	1,585	317	856	349	349	1,870	21	34	14	14	83	(83)
	4	13	1,585	317	856	349	349	1,870	21	34	14	14	83	(83)
	5	14	1,585	317	856	349	349	1,870	21	34	14	14	83	(83)
	6	15	1,528	326	879	358	358	1,921	22	35	15	14	86	(80)
	7	16	1,660	332	896	365	365	1,959	22	36	15	15	89	(77)
	8	17	1,673	335	903	368	368	1,974	22	36	15	15	89	(77)
	11	20	1,699	340	917	374	374	2,005	23	37	15	15	90	(76)
	22	31	1,699	340	917	374	374	2,005	23	37	15	15	90	(76)

Notes (a) 3.5 persons per family.
(b) Parentheses indicate surplus classrooms.

Table VI - 6

PROJECTED SCHOOL REQUIREMENTS AND ESTIMATED COSTS
(Base Population 10,000 - 1975 Dollars)

Type of School	Students[1] per 10,000 population (3192 total)	Students[2] per Family	Sq. ft. per Pupil[1]	Students per Classroom	Total Classrooms Needed 10,000 pop	Sq. ft. per Classroom	Construction Costs per Sq. ft.	Construction Costs per Classroom	Total Classroom Construction Costs
Nursery Schools	541	.20	60(c)	15	36	900	$29.85	$ 26,865	$ 967,140
Elementary Schools - two	1,460(d)	.54	120(a)	25	58	3,000	$36.70(b)	$110,000	$6,385,800
Junior/Senior High Schools - one	1,190	44	150(a)	25	48	3,750	$35.64(b)	$133,650	$6,415,200

	Site Acquisition[2]										
(continued)	Acres Required	Total Cost	Landscaping Costs[1]	Recreation Area[1]	Furnishings Costs[1]	Parking[1]	TOTAL CAPITAL COST	TOTAL PER CAPITA CAPITAL COST	OPERATION AND MAINTENANCE PER STUDENT PER YEAR[3]	TOTAL O/M EXPENDITURE /10,000	O/M PER CAPITA
Nursery Schools	–	–	–	–	$145,071	–	$1,112,211	$111	$ 540	$ 292,140	$ 29.21
Elementary Schools	28.9	$115,600	$ 9,911	$290,950	$957,870	$21,823	$7,781,954	$778	$1,230	$1,795,800	$179.58
Junior/Senior High Schools	54.0	$216,000	$16,030	$290,950	$962,280	$62,144	$7,962,604	$796	$1,230	$1,463,700	$146.37

Notes: (a) Real Estate Research Corporation, 1974, p. 111.
(b) Escalated from $27.75 per sq. ft. for elementary schools and $26.95 for high schools at 5% per year to approximate 1975 dollars.
(c) Assumes ½ elementary space required for nursery school children.
(d) 2 elementary schools required at an average of 828 pupils/school (Costs of Sprawl, pages 110-111).

Sources: 1. Real Estate Research Corporation, 1974, page 111.
2. DeChiari and Koppelman, 1975.
3. Based on school district mill levies in Garfield, Mesa and Rio Blanco counties as given in Office of the Governor of Colorado, IMPACT, III, 1974, pages III/A/39 - III/A/150.

in the population. According to a study by the Federation of Rocky Mountain States, about 120,196 people or about five percent of the State's population participated in some form of vocational-technical program in 1974 in Colorado.[1] The student count includes secondary, post secondary and adult programs. There are no standards for estimating use rates for voactional-technical programs in energy development situations.

The Denver Public Schools calculate that for every three full time equivalent high school students, there is one f.t.e. student enrolled in a vocational education course. Another estimate is that about 50 percent of the students in Denver take one or more vocational education courses. At the secondary level, the vocational program has about 10 percent of the number of students enrolled in regular programs. At the adult post secondary level, 5 to 10 percent of the population of the city of Denver is enrolled in the program based on an f.t.e. count.

For purposes of this report, it is assumed that about five percent of the population would be involved in a vocational-technical program on an f.t.e. basis. A five percent user rate would mean that in a city of 10,000 people, 500 people would need some form of facilities or take some sort of course related to vocational-technical education. At a rate of 150 junior high and high school students per 1,000 people in a population, a city of 10,000 people would have 1,500 students. Ten percent of 1,500 gives the f.t.e. of secondary level students. The total of 650 f.t.e. vocational students is equivalent to that number of students for which

If the user rates are similar for a town experiencing rapid growth, the calculations shown in Table VI-7 apply.

Operating and maintenance costs can be figured at $1,688 per f.t.e. pupil. This figure is about the same as the per pupil cost for the operation and maintenance of a junior high school in the western slope area.[3]

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1. Federation of Rocky Mountain States, 1975, p. 53.

2. The information on space needs and costs was provided by a representative of Denver Public Schools in phone conversations during December, 1975. Site acquisition costs are based on the estimates of realtors in the Rifle and Meeker area.

3. A spokesman from the State Board for Community Colleges and Occupational Education provided per pupil operating costs for the following vocational programs: heavy equipment mechanics - $1,625; diesel mechanics - $1,270; welding - $1,950; building trades - $1,800; masonry - $1,400; and mine mechanics - $2,084. The figure for operating and maintenance costs used here, $1,688, is the average of these six calculations.

The total capital cost for 650 f.t.e. vocational education students is $5,424,000. The per capita cost for a city of 10,000 people would be $542.40. Per capita operating and maintenance costs can be estimated at $109.72.

e. Higher Education

The college going rate in Colorado for 1972, 1973 and 1974 was 50.0, 52.8 and 53.2 students per 1,000 people respectively.[1] Costs related to college attendance may be calculated by considering the out-of-state tuition charges which cover all costs except capital construction. Out-of-state tuition ranged from a high of $2,123 per academic year at the University of Colorado in Boulder to a low of $939 at Trinidad Community College in 1975. At an average of $1,400 per academic year, a community of 10,000 with a college going rate of 53.2 per thousand would have $744,800 for operating and maintenance expenses. Capital construction expenses for the same 532 students can be very roughly estimated by multiplying the square foot requirement per college student (about 100 square feet) by $37.50 per square foot. This figure is $1,995,000, as shown in Table VI-8.

Depending on the accuracy of these estimates, the total higher education expenses for a community of 10,000 would be $273.98 per capita.

3. Water

Cost figures for upgrading the Rifle and Meeker water systems have been prepared by McDowell-Smith and Associates and are shown in Table VI-9.[2] Rifle's present water system is adequate for the 1975 population of 2,750. An upgraded water system would service a total population of 8,600 persons at a total additional capital cost of $1,445,000. Since the 1975 system is adequate for the 1975 population, it is assumed that any upgrading is necessitated by the additional new population of 5,850 people, under normal growth without oil shale development. The total cost incurred by each new person is $246 ($1,445,000 per 5,850). The cost of upgrading the Rifle water system for the projected Rifle population of 8,600 is $168 per capita. The former number is used to estimate costs per capita because it describes costs incurred by a new population only.

The Meeker water system is not adequate to meet the 1975 population needs. Upgrading to meet a future population of 4,500, which includes those whose 1975 needs are insufficiently met, will cost a total of $1,200,000 or $267 per capita.[3] This is based on the assumption that the whole population (as opposed to just incoming population) will bear the cost of upgrading. These estimates are much lower than CWACOG estimates which put the cost at $777 per capita.

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[1] Information used in this section was provided by the Colorado Department of Higher Education in telephone conversations during December, 1975

[2] McDowell-Smith and Associates, 1975, pages 22-28.

[3] Wright McLaughlin Engineers, personal interview, October, 1975.

Table VI - 7

PROJECTED VOCATIONAL-TECHNICAL EDUCATION NEEDS AND ESTIMATED COSTS

(Population base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
For 650 students at 184.6 sq. ft. per student (Total space = 120,000 sq. ft. Instructional space = 87,000 sq. ft.) 120,000 x $32.50 per sq. ft.[1]	$ 3,900,000.00
Equipment[1]	1,500,000.00
Site Acquisition – 6 acres x $4,000.[2]	24,000.00
TOTAL CAPITAL COSTS	$ 5,424,000.00
TOTAL CAPITAL COSTS PER CAPITA	$ 542.00
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Total operation and maintenance cost[3]	$ 1,097,200.00
TOTAL OPERATION AND MAINTENANCE PER CAPITA	$ 109.72

Source: 1. Representative of Denver Public Schools, telephone interviews, December, 1975.
2. The site costs are derived from estimates made by Rifle and Meeker area realtors.
3. Representative of the State Board for Community Colleges and Occupational Education, correspondence, January, 1976.

Table VI - 8

PROJECTED HIGHER EDUCATION NEEDS AND ESTIMATED COSTS

(Population base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
532 students at 100 sq. ft./student at $37.50/sq. ft.	$ 1,995,000.00
TOTAL CAPITAL COSTS	$ 1,995,000.00
TOTAL CAPITAL COSTS PER CAPITA	$ 199.50
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Total operation and maintenance cost	$ 744,800.00
ANNUAL OPERATION AND MAINTENANCE PER CAPITA	$ 74.48

Source: Colorado Department of Higher Education, telephone interviews, December, 1975.

Table VI - 9

PROJECTED WATER REQUIREMENTS AND ESTIMATED COSTS

(Population Base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
Total Water System Upgrading Costs(a)	$ 2,540,000.00(b)
TOTAL UPGRADING COSTS PER CAPITA	$ 257.00
ANNUAL OPERATION AND MAINTENANCE COSTS	
Total Operation and Maintenance Costs	$ 184,400.00
TOTAL OPERATION AND MAINTENANCE PER CAPITA(c)	$ 18.44

Notes:

(a) These figures represent the average of estimated costs for upgrading the water systems in both Meeker and Rifle. This estimate assumes that water supply, treatment and distribution systems will be upgraded and not newly built. Upgrading yields lower costs than estimates cited in other studies for new facilities. C-b staff estimates are $385 per capita for a New Town of 5,950 persons. The THK, 1974 estimate is $777 per capita (page 30). The 50% sprawl – 50% P.U.D. development pattern from Real Estate Corporation, 1974, is $478.00 and the low density sprawl estimate is $825.00 (page 124).

(b) This figure is extrapolated from the anticipated expenditure of $1,445,000 for a population increase of 5,850 in Rifle and $1,200,000 for a total population of 4,500 people in Meeker.

(c) These estimates are taken from Colorado West Area Council of Governments, September, 1974, page 35. The estimates are based on 1973 dollars for Garfield and Rio Blanco Counties escalated to 1975 dollars at 8%. The Cost of Sprawl estimates are operating and maintenance costs at $10.54 per capita in 1975 dollars.

Sources: The costs of upgrading the Rifle water system are taken from source 1. below and the Meeker system costs are taken from source 2. below.

1. McDowell, Smith and Associates, 1975, pages 22-28.
2. Wright-McLaughlin Engineers, 1975, interview.

4. Sanitation

Costs have been estimated also for upgrading the sewage systems in Meeker and Rifle. The total cost for systems improvement in Rifle is $603,500, or $103 per capita for an estimated population increase of 5,850 persons.[1]

The Meeker sewage system also is currently adequate. Costs to meet the needs of an additional 2,000 people for which Meeker's Phase I sewage system is being planned, have been estimated at $900,000 or $450 per capita.[2] The average per capita figure for both Rifle and Meeker is $277 (see Table VI-10).

5. Storm Drainage

Storm drainage costs are estimated in Table VI-11. Operation and maintenance costs are not included here, because no estimates are available. It is assumed that maintenance would be generally limited to routine removal of debris from catch basins. The Costs of Sprawl estimates are based upon urban data. Given the low annual rainfall in the area, estimates are based on 25 percent of The Costs of Sprawl estimates of $375 per capita in 1975 dollars yielding a capital expenditure of $94 per capita.[3]

6. Solid Waste

The costs for solid waste collection and disposal can be found in Table VI-12. This table also provides estimates of operation and maintenance costs for solid waste service.

7. Open Space and Recreation

The costs to a community for recreation vary with the location of the community. A city located near national forests and other open areas may not have the same demand for open space that urban areas have. The estimates shown in Table VI-13 suggest open space based on minimum standards for new urban development. The population base is figured at 10,000 for this analysis. The figures in Table VI-13 do not include parking or landscaping.

8. Governmental Regulations and Administration

The costs associated with governmental planning and administration in this analysis include the capital cost of the municipal building, equipment, furnishings and one acre of land. On-going operation and maintenance costs are computed also, which include municipal fiscal administration, planning, zoning, general control and regulation, as well as salaries for the mayor or city manager and municipal council members. These costs are shown in Table VI-14. The estimates do not include parking, landscaping or municipal garage costs.

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[1] McDowell-Smith and Associates, 1975, pages 22-42.

[2] Merrick and Company, 1974, p. 170.

[3] Real Estate Research Corporation, 1974, p. 123.

Table VI - 10

PROJECTED SEWAGE SYSTEM REQUIREMENTS AND ESTIMATED COSTS
(Population Base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
Total Sewage System Capital Cost[1,2]	$ 2,770,000.00(a)
TOTAL CAPITAL COSTS PER CAPITA	$ 277.00
ANNUAL OPERATION AND MAINTENANCE COSTS	
Total Operation and Maintenance Costs	$ 135,200.00(b)
TOTAL OPERATION AND MAINTENANCE PER CAPITA	$ 13.52

Notes:

(a) The figures presented here show an average cost for upgrading the sewage system of Rifle (based on McDowell-Smith and Associates, 1975, pages 22-42) and Meeker (based on Merrick and Company, 1974, page 170). Another estimate of capital requirements for the sewage system is escalated at 15% per year to arrive at $292 per capita (based on a development situation with 50% sprawl and 50% P.U.D. as given in Real Estate Research Corporation, 1974, page 122). The figure of $472 per capita is the high cost case presented for the low density sprawl situation in Real Estate Research Corporation, 1974, page 122. The THK Associates, Inc., 1974, study estimates that a sewage treatment and collection system will cost $552 per capita in 1974 dollars (page 30).

(b) Colorado West Area Council of Governments, September, 1974; page 35. These are Rio Blanco County estimates escalated to 1975 dollars at 8% per year.

Sources: The costs of upgrading the Rifle sewage system are taken from source 1. below and the Meeker system costs are taken from source 2. below.

1. McDowell, Smith and Associates, 1975, pages 22-42.
2. Merrick and Company, 1974, page 170.

Table VI - 11

PROJECTED STORM DRAINAGE NEEDS AND ESTIMATED COSTS
(Population base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
Total capital expenditure	$ 937,500.00[1]
TOTAL CAPITAL COSTS PER CAPITA	93.75
ANNUAL OPERATION AND MAINTENANCE	N/A(a)

Notes:

(a) This figure is not calculated. Costs would be included in normal street maintenance costs.

Source:

1. Real Estate Research Corporation, 1974, page 123. The 1973 costs are escalated to 1975 dollars at 15% per year for the 50% sprawl – 50% P.U.D. situation. The low density sprawl estimate is $510. per capita. Estimates are made here at 25% of the Cost of Sprawl estimate.

Table VI - 12

PROJECTED SOLID WASTE COLLECTION REQUIREMENTS AND ESTIMATED COSTS
(Population base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
Total Capital Cost	$ 90,200.00[1](a)
TOTAL PER CAPITA CAPITAL COSTS	9.02
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Total Operation and Maintenance	$ 100,500.00
TOTAL OPERATION AND MAINTENANCE COSTS PER CAPITA	10.50(b)

Notes:

(a) This estimate does not include site acquisition costs.

(b) The operation and maintenance estimate assumes a waste pick-up service charge of $3.00 per month for each housing unit.

Source:

1. Cost estimates here are escalated at 15% per year from the estimates made in Real Estate Research Corporation, 1974, page 115 for a 50% sprawl – 50% P.U.D. development situation.

Table VI - 13

PROJECTED OPEN SPACE AND RECREATION NEEDS AND ESTIMATED COSTS

(Population Base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
Playgrounds – 15 acres[1] x $10,580.00[2]	$ 158,700.00
Neighborhood Parks – 20 acres (site acquisition and development costs can be accounted for in school expenditures. Operation and maintenance included here.	
Playfields – 15 acres x $10,580.00	158,700.00
Community Parks – 35 acres x $10,580.00	370,300.00
District Parks – 20 acres x $10,580.00	211,600.00
1 Indoor Recreation Center 1 acre or 43,560 sq. ft. x $30.80	1,341,648.00
Parking – 10 acres or 435,600 sq. ft. x $.41	178,596.00
TOTAL INITIAL CAPITAL COSTS	$ 2,419,544.00
TOTAL CAPITAL COSTS PER CAPITA	$ 242.00
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Salary is 80% of total expenditure 15 persons at $9,337.00	$ 140,055.50[3]
Other operating and maintenance costs	35,014.00[3]
TOTAL OPERATION AND MAINTENANCE COSTS	$ 175,069.50
TOTAL OPERATION AND MAINTENANCE PER CAPITA	$ 17.50

Sources: 1. Open space and recreation needs are based on DeChiara and Koppelman, 1975, page 363.

2. Per acre costs are taken from Real Estate Research Corporation, 1974, page 109. The costs are escalated at 15% per year.

3. Operation and maintenance costs are calculated accordingly with the formula used in Real Estate Research Corporation, 1974, page 109. Colorado West Area Council of Governments, September, 1974, estimates are $13.81 per capita averaged for Rio Blanco and Garfield Counties escalated from 1973 dollars to 1975 dollars at 8% per year.

Table VI - 14

PROJECTED GOVERNMENT REGULATION AND ADMINISTRATION SERVICES AND ESTIMATED COSTS

(Population Base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
1 – 4,545 sq. ft. building x $42.25 per sq. ft.[1]	$ 192,026.00
Equipment and furnishings at 15% of structure .15 x $192,026	28,804.00
Site Acquisition – 1 acre x $4,000.00	4,000.00[2]
TOTAL CAPITAL COSTS	$ 224,830.00
TOTAL CAPITAL COSTS PER CAPITA	22.50
ANNUAL OPERATIONS AND MAINTENANCE COSTS:	
Total Government (normal operations) costs[3]	$ 505,300.00
TOTAL OPERATION AND MAINTENANCE PER CAPITA	50.53

Sources:

1. Square foot requirements and cost estimates are extrapolated from Real Estate Research Corporation, 1974, page 130.
2. Based on estimates of realtors in the Meeker and Rifle area in October, 1975.
3. Government operation and maintenance costs are estimated at $50.53 per capita in 1975 dollars. From Colorado West Area Council of Governments, September, 1974, page 35. This includes Financial Administration, General Control and Maintenance of General Public Buildings.

9. Growth Planning and Consultation Services

The adequate planning and management of rapid growth will depend upon the capacity of the local county and town governments to respond. At a minimum, planning staffs should be available for five years and funds should be provided for consultation services for at least two years. (see Table VI-15).

10. Police Protection

The need for police protection, which is estimated in Table VI-16 has been calculated at two officers per 1,000 people and one vehicle per 1,500 people.[1] The estimates in this analysis for officer and vehicle needs, like the other cost estimates, are based on the average requirements for a community of approximately 10,000 persons.

11. Fire Protection

Adequate fire protection depends on the number and location of hydrants and fire stations and the availability of sufficient hydrant flow pressures, the community development pattern and building composition. The response area served by a fire station is determined by the type of buildings in the area and the fire flow pressure to that area. A response area should not be more than 1 1/2 miles calculated on a diamond shaped pattern where schools and commercial buildings are included.[2] A strictly residential area may have a two mile response area at the maximum.

A small city may require two pumper stations. Arrangements are often made to have volunteer firemen assist the full-time firemen. Under these conditions, the major requirement of full-time staff would be to get the fire fighting equipment to the fire. Such an arrangement would help to reduce the full-time staff needs so that only one man per vehicle need be on duty.

It is difficult to assess just what an area will need without knowing the heights, construction types, ground floor area, occupancy rates and fire flows for all buildings in the area. The figures in Table VI-17 should be used to calculate rough estimates of costs of two fire stations and necessary equipment.

12. Library

Library costs are estimated in Table VI-18.

13. Health Services and Facilities

Basic health needs are estimated at 2.45 hospital beds per 1,000

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[1] VTN, Colorado, 1975, p. A-85.

[2] Insurance Services Office, telephone interview, Denver, Colorado, October, 1975.

Table VI - 15

PROJECTED GROWTH PLANNING AND CONSULTATION SERVICES AND ESTIMATED COSTS

(Population Base 10,000 – 1975 Dollars)

Item	Cost
GROWTH PLANNING AND CONSULTATION SERVICE COSTS:	
Growth planning and management ($238,854 per year for 5 years)	$1,194,268.00[(a)]
Planning consultant services ($477,708 per year for 2 years)	955,416.00[(b)]
TOTAL ONE-TIME PLANNING AND CONSULTANT SERVICES	$2,149,684.00
TOTAL PLANNING AND CONSULTANT SERVICES PER CAPITA	$ 214.97

Notes: (a) This estimate assumes that 5 planners at $15,000 each plus 100% overhead for 5 years would be necessary for an induced population of 6,280 people.

(b) Assumes $150,000 per county for a population of 6,280 people.

Source: C-b Staff estimates.

Table VI - 16

PROJECTED POLICE PROTECTION NEEDS AND ESTIMATED COSTS
(Population Base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
1 – station at 2,000 sq. ft.[1] x $41.15[2]	$ 82,300.00
Equipment (not including communications) at 10% of structure – .10 x $823.00	8,230.00[3]
Communications equipment	26,049.00[3]
Furnishings at 15% of structure .15 x 82,300.00	12,345.00[3]
Parking – 6,400 sq. ft. x $.49	3,136.00[3]
Landscaping – 14 acres x $1322.50 per acre	529.00[3]
Site acquisition – 1 acre x $4,000.00	4,000.00[4]
Vehicles – 7[5] x $7935.00	55,545.00[3]
TOTAL INITIAL CAPITAL COSTS	$ 192,134.00
TOTAL CAPITAL COSTS PER CAPITA	19.21
ANNUAL OPERATION AND MAINTENANCE COSTS	
Total Operation and Maintenance	$ 201,200.00[6]
TOTAL OPERATION AND MAINTENANCE COSTS PER CAPITA	20.12

Sources:

1. The structure needs for a police station are calculated at 200 square feet per 1,000 population based on standards given in VTN, Colorado, 1975, page A-85.
2. Robert Snow Means Co., Inc., 1975, page 217.
3. These estimates are extrapolated from Real Estate Research Corporation, 1974, page 118.
4. The site costs are derived from estimates made by Rifle and Meeker area realtors.
5. Vehicle needs are based on the standard of 1 vehicle for every 1,500 people given in VTN Colorado, 1975, page A-85.
6. Operation and maintenance costs are escalated at 10% from estimates given in Real Estate Research Corporation, 1974, page 117.

Table VI - 17

PROJECTED FIRE PROTECTION REQUIREMENTS AND ESTIMATED COSTS
(Population Base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
2 – 9,000 sq. ft. stations including 2 stalls and 3 doors (space for 3 vehicles)[1] Structure Cost – 2 x 9,000 x $34.20/sq. ft.[2]	$ 615,600.00
Vehicles – 2 x 7,935.00	15,870.00[3]
1 – 1,250 gpm pumper	50,000.00[3]
1 – ladder truck	150,000.00[3]
1 – emergency vehicle (with tower)	33,000.00[3]
Equipment and furnishings, 15% of structure	92,340.00[3]
Site acquisition – 1.5 acres x $4,000.00	6,000.00[4]
TOTAL CAPITAL COSTS	$ 962,810.00
TOTAL CAPITAL COSTS PER CAPITA	96.28
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Total operation and maintenance	$ 247,700.00[5]
TOTAL OPERATION AND MAINTENANCE PER CAPITA	24.77

Sources:

1. The estimates of the number and size of the fire stations required is based on a conversation with the Insurance Services office of Denver, Colorado, in October, 1975.
2. Robert Snow Means Co., Inc., 1975, page 212.
3. Equipment needs and costs are extrapolated from Real Estate Research Corporation, 1974, page 120. These equipment needs were corroborated in conversation with the Littleton, Colorado Fire Department in October, 1975.
4. Land costs were obtained from realtors in the Rifle and Meeker area in October, 1975.
5. Operation and maintenance estimates are extrapolated from Real Estate Research Corporation, 1974, page 120.

Table VI - 18

PROJECTED LIBRARY NEEDS AND ESTIMATED COSTS
(Population Base 10,000 – 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
1 – 7,500 sq. ft.[1] library building x $38.45/sq. ft.[2]	$ 288,375.00
Site acquisition – 1 acre x $4,000.00	4,000.00
Equipment and furnishings – 20% x structure cost	57,675.00[3]
Advance books – 1 per capita at $13.23 each	132,300.00[3]
TOTAL INITIAL CAPITAL COSTS	$ 482,350.00
TOTAL CAPITAL COSTS PER CAPITA	$ 48.00
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Staff – 5 x $1,920.00 (Salaries are 57% of total operating costs)	$ 39,600.00[3]
Other Operation and Maintenance Costs	$ 34,450.00[3]
TOTAL OPERATION AND MAINTENANCE COSTS	$ 74,050.00
TOTAL OPERATION AND MAINTENANCE PER CAPITA	$ 7.40

Sources:

1. DeChiara and Koppelman, 1975, page 350.
2. Robert Snow Means Company, Inc., 1975, page 215.
3. Extrapolated from Real Estate Research Corporation, 1974, page 130.

persons[1] and one physician per 1,400 persons.[2] The estimates shown in Table VI-19 are based on a population of 10,000 using the above standards.

The estimates do not include the costs of special services such as ambulance services or emergency calls.

14. Human Services

a. Introduction

The need for human services in rapid growth situations is often given a secondary position relative to housing and municipal services. The demand for housing and municipal services is generally so acute that little attention is paid to services related to less visible human needs. There is evidence suggesting that adequate and timely provision of housing and services, such as recreation and shopping, can greatly reduce the human problems related to boom town growth situations. Unfortunately, adequate housing and services are often not available. Even where they might be available, the other stresses of rapid construction projects may accelerate normal problems.

Among the disrupting experiences related to such projects are isolation for wives and children, long working and traveling days, new and unfamiliar environments and inflated prices. If housing, roads, schools, shopping facilities and other services are not available, the ordinary difficulties of relocation will be even further exaggerated. Rapid growth may also produce problems for the existing residents, especially if there is a high proportion of elderly persons on fixed incomes. The high wages paid construction workers may inflate prices and lead to instability in traditional areas of the economy when employees leave these jobs for construction or mining. People with fixed incomes and those who do not make high wages may be forced out of their homes and out of the area.

Statistical information on the rates of personal and social difficulties related to energy development is scanty. Some information is available documenting the types of problems which occurred recently in Wyoming boom towns. One available study was done by ElDean Kohrs, Clinical Director of the Central Wyoming Counseling Center at Casper, Wyoming. Kohrs compared some statistics of three counties that grew 121 percent between 1960 and 1970 (Campbell County), one that did not grow between those years (Carbon County), and one that declined at a rate of minus 6.7 percent (Goshen County). Campbell County had the peak of its most recent boom in 1970. The figures compiled by Kohrs show that recorded incidents of trouble were higher in counties experiencing rapid growth than in counties experiencing declining or stable growth. The rates of far exceed the differences in population of the counties with the exception of two cases, namely, general relief and liquor sales. The higher rate of

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1. Bureau of Land Management, 1975, p. 348 (based on Colorado Department of Health, 1975, p. A-57).

2. There is currently a ratio of 1,400 persons to one physician in the Rifle area.

Table VI - 19

PROJECTED BASIC HEALTH REQUIREMENTS AND ESTIMATED COSTS

(Population Base 10,000 - 1975 Dollars)

Item	Cost
INITIAL CAPITAL COSTS:	
25 hospital beds[1] (at 700 sq. ft. each[2] x $53.10 per sq. ft.[3])	$ 929,250.00
Site acquisition – 2.5[2] acres x $4,000.00	10,000.00[4]
Parking – 615 sq. ft. per bed x $.49 per sq. ft.	7,474.00[2]
Landscaping – 2 acres x $1,322.50	2,645.00[2]
Equipment – 45% of structure	418,162.50[2]
TOTAL INITIAL CAPITAL COSTS	$1,367,531.50
TOTAL CAPITAL COSTS PER CAPITA	$ 137.00
ANNUAL OPERATION AND MAINTENANCE COSTS:	
Personnel – $17,369.77 per bed (25)	$ 434,244.00[2]
Other operation and maintenance costs – $12,296.60 per bed (25)	307,415.00[2]
TOTAL OPERATION AND MAINTENANCE	$ 741,658.00
TOTAL OPERATION AND MAINTENANCE PER CAPITA	$ 74.17(a)

Note:

(a) Another estimate of operation and maintenance expenses for health services is $144.97 per capita per year in Colorado West area Council of Governments, September, 1974, page 35.

Sources:

1. The bed requirement is based on a standard of 2.45 beds per 1,000 population from Colorado Department of Health, 1975, page A – 57.
2. These cost and space requirements are taken from Real Estate Research Corporation, 1974, page 130. Escalated to 1975 dollars at 8% per year.
3. Robert Snow Means Company, Inc., 1975, page 214.
4. Land costs are based on estimates of realtors from the Rifle and Meeker area in October, 1975.

general relief and higher per capita liquor sales in Carbon County may be explained by some very rapid growth that occurred around 1970. (see Tables VI-20, A-J).

A variety of labels could be given to the sort of problems that can be met with human services. The State of Colorado's IMPACT study identified the areas of concern falling under the aegis of five State organizations. Table VI-21 shows these areas and their respective agencies.

The many services in Table VI-21, designated as State responsibilities, may actually be financed and carried out by private (profit and non-profit) groups, by county, city, or state agencies, or by the Federal Government. Human services have as a primary objective the personal and social welfare of the persons served, unlike municipal services which are designed to meet the physical demands of a community. Because of the nature of social and personal needs, services of this kind are, for the most part, best provided in the community according to the interests and problems of each particular community. Some variation of social service programs will exist in each community relative to the community's needs.

It is likely that human services for energy impacted communities will be funded by the Federal Government as the government becomes more aware of the problems consequent upon development. Community needs and services previously unnoticed or ignored may be manageable with Federal support in the future.

The following description of human services and costs is intended to define the needs of a community of 10,000 persons located in an energy development region such as may be the case with Tract C-b. No effort is made to differentiate the sources of funding or the responsible agency for the service listed.

b. Mental Health

The projected expenses for Garfield County mental health services for 1976 are broken out as 76 percent salaries and benefits, 17 percent operating expenses such as rent and telephone, 5 percent travel and 2 percent capital outlay for items such as typewriters.[1] The Colorado West Center calculated their 1976-77 expenses at $4.90 per capita. The multiplier for case load increases related to rapid development used by the State is 2.5 per capita.[2] Mental health and operating and maintenance costs can thus be figured at $12.25 per capita.

The figure of $12.25 primarily covers out patient services and adult psychiatric services which would not involve capital construction expenses. Costs for an inpatient service center have not been calculated.

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1. Colorado West Regional Mental Health Center, Glenwood Springs, telephone interview, December, 1975.

2. This is the multiplier used by the Colorado West Regional Mental Health Center in their estimates of service needs in IMPACT, III, p. III/C/15. Also see the manpower distribution estimates on pages III/C/20 - III/C/21 and III/C/75 - III/C/85.

Table VI-20 A

POPULATION OF CAMPBELL, CARBON AND GOSHEN COUNTIES, WYOMING (1970)

County	Population	% Over Carbon County	% Over Goshen County
Campbell	12,957	-3%	+16%
Carbon	13,354		
Goshen	10,885		

Table VI-20 B

ARRESTS IN THREE COUNTIES IN WYOMING (1970)

Counties	Arrests	Ratio Population to Incidents	% Over Carbon County	% Over Goshen County
Campbell	1,025	12.6	+139%	+204%
Carbon	614	21.7		
Goshen	337	32.3		

Table VI-20 C

PUBLIC DRUNKENNESS IN THREE COUNTIES IN WYOMING

(1970)

County	Public Drunkenness	Ratio Population to Incidents	% Over Carbon County	% Over Goshen County
Campbell	134	96.7	+139%	+185%
Carbon	56	238.46		
Goshen	47	231.6		

Table VI-20 D

DRIVING WHILE UNDER THE INFLUENCE IN THREE COUNTIES IN WYOMING

(1970)

County	Incidents	Ratio Population to Incident	% Over Carbon County	% Over Goshen County
Campbell	98	132.2	+350%	+350%
Carbon	20	666.7		
Goshen	20	544.3		

Table VI-20 E

CRIMINAL BUDGET IN THREE COUNTIES IN WYOMING
(1970)

County	Budget	Dollars Spent Per Person	% Over Carbon County	% Over Goshen County
Campbell	$1,118,597	$86.33	+51%	+62%
Carbon	551,507	41.30		
Goshen	419,500	38.52		

Table VI-20 F

MARRIAGES AND DIVORCES IN THREE COUNTIES IN WYOMING
(1970)

County	Marriages	Divorces	Ratio Marriages to Divorces	Ratio Population per Divorce	% Divorces Over Carbon County	% Divorces Over Goshen County
Campbell	130	72	1.8	180	+33%	+85%
Carbon	148	54	2.7	247.3		
Goshen	129	39	3.3	279.1		

Table VI-20 G

SCHOOL DROP-OUTS IN THREE COUNTIES IN WYOMING (1969 - 1970)

County	Drop-Outs	Rate	% Over Carbon County	% Over Goshen County
Campbell	70	5.0%	+26%	+56%
Carbon	52	3.4%		
Goshen	31	2.3%		

Table VI-20 H

PERSONS ON GENERAL RELIEF IN THREE COUNTIES IN WYOMING (1970)

County	Total Persons on Relief	Ratio Population to Persons on Relief	% Over Carbon County	% Over Goshen County
Campbell	230	56.3	-34%	+505%
Carbon	349	38.3		
Goshen	38	286.4		

Table VI-20 I

PERSONS RECEIVING INDIVIDUAL WELFARE IN THREE COUNTIES IN WYOMING (1970)

County	Number Receiving Individual Welfare	Ratio Population to Individual Welfare Recipient	% Over Carbon County	% Over Goshen County
Campbell	88	147.2	+57%	+48%
Carbon	56	238.5		
Goshen	15	725.7		

Table VI-20 J

DOLLAR SALES OF LIQUOR IN THREE COUNTIES IN WYOMING (1970)

County	Dollar Sales	Dollars Spent per Person	% Over Carbon County	% Over Goshen County
Campbell	$502,633	$38.79	-20%	+102%
Carbon	627,790	47.01		
Goshen	249,019	22.88		

Source: Tables V-20 A-J were taken from ElDean Kohr's "Social Consequences of Boom Growth in Wyoming", a paper given at the Rocky Mountain American Association for the Advancement of Science Meeting, April 24-26, 1974, in Laramie, Wyoming, pages 4-6.

Table VI - 21

STATE AGENCIES PROVIDING HUMAN SERVICES IN COLORADO

State Agency	Service
I. Department of Education	I. Education
	I.a. Elementary Education
	I.b. Junior High School Education
	I.c. High School Education
	I.d. Vocational Education
II. Commission on Higher Education	I. Higher Education
	I.a. Higher Education (Degree Programs)
	I.b. Continuing Education (Non-Degree Programs)
III. Department of Institutions	I. Mental Health Services
	I.a. Mental Health Centers
	I.b. Professional and Para-Professional Services in Conjunction with Community Needs
	II. Juvenile Corrections
	II.a. Parole and Probation
	II.b. Purchase of Services Community-Based Programs: Mental, Health, Parental Services, Educational Support, Vocational Education, Shelter Care
	II.c. Correctional Facilities
	III. Adult Corrections
	III.a. Parole and Probation
	III.b. Work Release
	III.c. Colorado State Penitentiary and Reformatory
	IV. Services for the Developmentally Disabled
	IV.a. State Home and Training Schools
	IV.b. Community Center Boards
	IV.c. Departments of Special Education in the Public Schools

Table VI - 21 (continued)
STATE AGENCIES AND SERVICES

State Agency	Service
IV. Department of Labor and Employment	
A. Division of Labor	I. Administration
	II. Labor Program
	II.a. Apprenticeship Council
	II.b. Labor Claims, Minimum Wage and Child Labor
	II.c. Private Employment Agencies
	II.d. Migratory Labor
	II.e. Labor Mediation
	III. Workmen's Compensation
	IV. Public Safety
	IV.a. Public Safety – School Inspection
	IV.b. Public Safety – Boiler Inspection
	V. Oil Inspection
	VI. Colorado Occupational Safety and Health
B. State Compensation Insurance Fund	I. Insurance Fund Administration
C. State Manpower Office	I. Manpower Funds Administration
V. Department of Social Services (County Administered)	
A. Public Welfare	I. Income Maintenance
	I.a. Old Age Pensions
	I.b. Aid to Families with Dependent Children
	I.c. Aid to the Needy Disabled
	I.d. Aid to the Blind
	I.e. General Assistance
	II. Child Welfare

Table VI-21 (continued)
STATE AGENCIES AND SERVICES

State Agency	Service
	III. Food Stamps
	IV. Social Services
	IV.a. Adult Services
	IV.b. Family Services
	IV.c. Day Care
	IV.d. Family Foster Care
	IV.e. Group Foster Care
	IV.f. Adoptions
	IV.g. Unmarried Parents
	IV.h. Prevention and Reduction of Births out of Wedlock
	IV.i. Family Planning
	IV.j. Mentally Retarded
B. Medical Assistance (Regionally Administered)	I. Claims Processing and Payment
C. Division of Rehabilitation	I. Rehabilitation Counseling Services
D. Division of Services for the Aging	I. Senior Centers
	II. Meal Programs
	III. Area Agencies on Aging

Source: Adapted from the Office of the Governor of Colorado IMPACT, III, Human Services Other than Health.

Such a center, however, would be very useful for treating severe cases of alcoholism and other problems that do not require long range treatment out of the community, yet cannot be managed immediately on a local out patient basis.

c. Developmental Disabilities

The State's Division for the Developmentally Disabled estimates that a range from 0.5 to 2 percent of the State's population is affected by some developmental disability. Their cost estimates range from $27,000 to $291,000 for a Region 11 population of 101,026 people. By this estimate, costs of services for the developmentally disabled for a population of 10,000 would range from $2,700 to $28,800.[1] These figures result in a per capita range from $.27 to $2.88 for all persons in Region 11.

d. Physical Rehabilitation

The Glenwood Springs office of the State Department of Rehabilitation estimates the average cost of rehabilitation services to be $1.00 per capita.[2] At a multiplier of 2.5 this figure would amount to $2.50 per capita.

e. Social Services

The Garfield County Department of Social Services' budget for 1976 is $604,488.[3] At a 1975 population of 16,970 the per capita cost of social services is $35.86.[4] This budget is itemized as follows:

Administration	$219,788
Assistance Payments:	
Aid to Blind	2,000
Aid to Families with Dependent Children	239,000
Aid to the Needy Disabled	36,000
Medical Transportation	2,000
General Assistance	9,700
Social Services:	
Foster Care	69,000
Day Care	30,000
Service Payments	10,000

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[1] Office of the Governor of Colorado, IMPACT, III, 1974, p. III/C/71.

[2] State Department of Rehabilitation, Glenwood Springs Office, telephone interview, December, 1975.

[3] This information was obtained in a telephone conversation December, 1975, with a representative of the Garfield County Department of Social Services.

[4] This population estimate is based on the U.S. Census estimate for July, 1974, of 16,500, escalated at the same estimated growth factor of 2.85% that the country experienced during the period 1970-1974.

The Department estimates that a multiplier of 2.5 would reflect the increased demand for social services related to rapid energy growth. At this rate, the per capita cost for social services would be $89.65. Included in the increased demand for services would be a branch office located in the impacted community. The cost estimate covers operating and maintenance costs for the most part, although any necessary capital costs would be covered by the escalated figure according to the Garfield office.

f. Public Health

In addition to local hospitals, many health services can be managed in the home, in the schools, or in clinics. Clinics can handle specialized patient loads such as babies, the handicapped, well oldsters and industrial patients not requiring hospitalization. The Colorado Department of Health Division of Nursing[1] offered the following guidelines for rural public health services: one public health nurse for each 2,000 people, one supervisor for each eight nurses, 1/4 secretary for each nurse and 200 square feet of clinic and office space for each nurse.

Using these criteria, a population of 10,000 would require five health nurses, 1-5/8 time supervisor, one full time and one half time secretary and 1,125 square feet of office space. The expense for a clinic of this size can be figured according to the following:

5 nurses x $11,136 per year	=	$55,680.00
5/8 supervisor x $14,220 per year	=	8,888.00
1 1/2 secretaries x $5,772	=	8,658.00
1,125 square feet rental space x $5.44[2]	=	6,120.00
5.625 nurses x $1,000 travel per year per nurse	=	5,625.00
5.625 x $200 miscellaneous expenses	=	1,125.00
Capital outlay (office set up) 5.625 x 422.63	=	2,377.29
Other (telephone, utilities, supplies, repairs, etc.) 5.625 x 676.20	=	3,803.63
Total		$92,276.92

The per capita public health nursing costs according to the above formula are $9.23. If space for clinics must be constructed, the cost per square foot can be figured at $37.80 per square foot.[3] It is assumed for purposes of this estimate that no escalation factor for public health nursing is necessary for rapid development situations because the formula is based on the needs of rural populations. Greater concentrations of people would require less travel and would allow the nurses to care for a greater number of people in one place.

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1. Colorado Department of Health, Division of Nursing, telephone interview, December, 1975.

2. This does not include costs of equipment and furnishings for the office. The costs of rental space are taken from IMPACT, III, P. III/C/84 at $4.50/foot and escalated at 15% for inflation. All other costs are based on Division of Nursing information.

3. Robert Snow Means, Inc., 1975, p. 216.

g. Services for the Elderly

Persons 60 and over average 14.8 percent of the population in the 16 counties of Planning and Management Regions 10, 11 and 12 in 1975. The average percentage of elderly in a boom community will be smaller as inflation forces older persons to relocate. If the average percentage of elderly in a community is 10 percent, a population of 10,000 would have 1,000 people over 60.

Estimates by the Area Agency on Aging in Grand Junction provide the following criteria needs for the elderly:[1] one van for 500 people, housing for 1/3 of the population with about 3/4 of that group needing separate apartments, two additional nurses in addition to the public nursing program for specialized care and provision of 500 meals per day per 1,000 elderly people. Based on these demands, costs for elderly services for a community of 10,000 can be roughly estimated.

Housing is the most expensive, yet most critical need of elderly persons in Region 11. Housing for 333 elderly people would require 250 units at perhaps 800 square feet each. Apartments for the elderly are estimated to cost $35.25 per square foot[2] which would give a total cost of $7,050,000 or $705 per capita. This figure does not include operating and maintenance expenses.

The other capital expense would be $30,000 for two vans. The total per capita capital expenses for these two services is $708.

Operating and maintenance costs can be figured according to the following formula:

2 drivers for the vans $6,200	=	$ 12,400
Maintenance for the vans 2 x $5,000	=	10,000
500 meals x 365 days x $2.00 each	=	365,000
2 public health nurses plus expenses	=	29,756
Total		$417,156
Per Capita		$41.72

The combined costs of these services and facilities is $7,467,156 or $746.72 per capita.

h. Corrections

Corrections programs may be designed in many ways. Traditional solutions to the increased problems related to quick growth center on additional law enforcement. Other approaches propose that many crime related difficulties can be managed in the communities through preventive programs such as partners for juveniles, work release programs and half way programs for adults and a general integration of corrections with other facets of the community. The approach outlined in this section generally follows suggestions given by authorities in the corrections field.

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[1] Information and estimates used in this section were provided in a telephone interview with the Area Agency on Aging in Grand Junction in December, 1975.

[2] Robert Snow Means Company, Inc., 1975, pages 214-215.

Juvenile Corrections: The crime rate for juveniles can be expected to constitute much of the crime problem related to energy development.[1] Total filings with the District Attorney's office in the District County in Moffatt County were up 107 percent in 1974 over 1973 and juvenile filings were up 63 percent.[2]

Many factors can influence contacts with authorities, their decision to arrest and their decision to convict. Different personnel may have radically different ideas on law enforcement. Where no community facilities or programs exist, judges may convict youthful offenders simply because there is no other alternative. The following items set forth one sort of program for a community with a population of 10,000 persons.

A Group Home for treatment within the community for holding runaways and for crisis intervention with a maximum of 15 beds and an average of 10 beds filled:

10 beds x $16.50 per day x 365 days	=	$ 60,225
Establishment of a Youth Services Bureau	=	45,000
Establishment of a Partners Program	=	25,000
Purchases of Services for Treatment from other agencies	=	50,000
Total		$180,225
Per Capita		$18.02

The costs for the above services would be about $18.02 per capita for a 10,000 person community, although these services might not reach an economy of scale until the community grows somewhat. Depending on the number and kind of juvenile problems and the volunteer support available, these services and costs could be apportioned to a regional area with, perhaps, 20,000 people. At this population, the per capita cost would be $9.01. Table VI-22 shows one arrangement of the many facets of a complete juvenile justice system.

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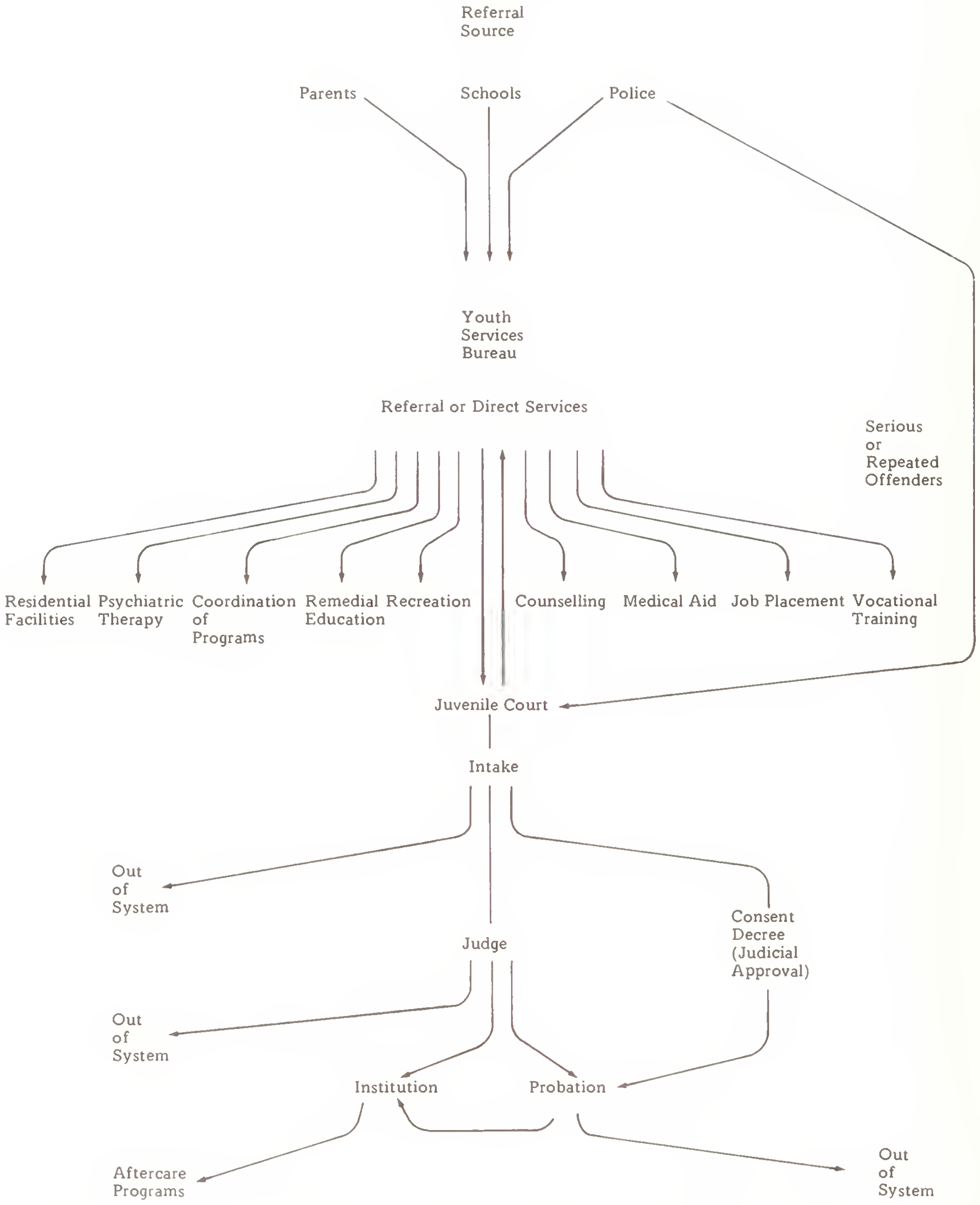
1. The information in this section was compiled from a number of sources including the Grand Junction and Denver Offices of Juvenile Parole, the Colorado Probation Office at Glenwood Springs, and from a former director of Community Group Homes in Denver. The suggestions about these programs were made in telephone conversations during the month of December, 1975.

2. District Attorney's Office, Craig, Colorado, correspondence, January, 1976.

Table VI - 22

PROPOSED JUVENILE JUSTICE SYSTEM



Source: Former Director, Community Group Homes, Denver, Colorado, December, 1975.

Adult Corrections: Two services would be useful in a small community for adult corrections. These services are a work program and half way house or community program center. Work programs may be conducted selectively in lieu of corrections or as part of another corrections program. A half way house program would be carried out for people who are making a transition back into the community after completing a sentence.

An effective community based adult work program will range in cost from $2,580.08 to $6,473.90 per participant.[1] A work program might be tied into other community programs such as vocational training. The more functions a program can serve, the more efficient that program will be.

Following are the locations, costs per person per year and number of average daily users for six different programs:

Fort Logan	$6,473.90	30
Grand Junction	5,750.00	20
Delta	4,384.93	100
All Contracted Services	5,183.00	---
Bailshall	4,063.45	40
Camp George West	2,580.08	50

Another community need is the half way house or community program center.[2] These programs can become self supporting after three years because the residents pay some of their daily expenses and the State or Federal Government pays the rest. Considering that almost as many people return home as are sent to correctional institutions every day, the community program center is likely to have strong financial and social advantages. These centers can also provide a number of other services besides the transition into work and community. The centers may be used as a diversion from prison for certain people, as a pre-release center or as a place for ex-offenders who have no other place to stay.

The minimum requirements for residents are 50 square feet per bed and one stool for each 10 persons. A community of 10,000 could support a 10 bed program. The costs of operating the facility can be figured at $15.00 to $20.00 per person per day or between $54,750 and $73,000 per year. These costs range from $5.48 to $7.30 on a per capita basis for a 10,000 person community. After three years the costs of the program should be reduced to zero.

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1. Work release costs for the fiscal year 1974-75 have been calculated by the Colorado State Research and Planning Office, Division of Correctional Services.

2. The description of a community program center followed here is based on a conversation with the Denver Community Center in December, 1975.

The State IMPACT study suggested also that an additional parole officer may be necessary for any substantial increase in population on the western slope.[1] A parole officer's salary and expenses were figured at $14,000 for fiscal year 1975-76 in the study.

The per capita costs for all three services can be estimated to range from $18.39 to $52.26, although practically none of these expenses would be borne by the community after a short period of time.

i. Cemeteries

Table VI-23 gives a per capita capital cost of $7.04 for cemeteries.

j. Summary

This section has shown a variety of human services that may be necessary in energy impacted communities. Some of these services are already available in one form or another in every community, due to State funding. The services that are not already available from the State may be provided through Federal funding, special State funding, industry participation and local financial and volunteer support. Total per capita costs for human services are summarized in Table VI-24.

Planning and implementation of these services may lag behind delivery of housing and physical infrastructure. However, some planning and lead time for these services may greatly reduce the difficulties of both the old and new residents in energy impacted communities. Reduced difficulties will lower turnovers and absenteeism from industry and maintain productivity at a steady rate. Early provision of human services will help to make possible a smooth transition from a transient construction community to a permanent operations population, as well as reduce the effects of rapid growth on human well being.

A community may house all or most of these services in a multi-purpose center. Such a center would reduce costs by sharing secretarial services, main office space, parking space and other facilities. As the community grows, services may expand into other parts of the community, such as would be the case with group homes and half way houses. There is much evidence supporting a community and local approach to managing human problems. The above description has shown some of the components of an effective human services program. Funding arrangements for the services are often complex and may require deliberate community effort as well as government and industry participation.

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1. Office of the Governor of Colorado, IMPACT, III, p. III/C/45.

Table VI - 23

PROJECTED CEMETERY REQUIREMENTS AND ESTIMATED COSTS
(Population Base 10,000 – 1975 Dollars)

Item	Cost
Capital Construction Costs	
Site Acquisition 2.3 acres[1] (a) x $4,000 =	$ 9,200
Landscaping 2 acres(b) x $1,100 per acre[2] =	$ 2,200
Parking 14,000 square feet(a) at $.41[2] per sq. ft.[2] =	$59,040
Total Capital Costs	$70,440
Per Capita Costs	7.04
Operation and Maintenance Costs(c)	

Notes:

(a) Parking requirements for a cemetery are assumed to be the same as for 1 church, i.e., 144,000 square feet or about .3 of an acre.

(b) Landscaping is assumed on all of the area except the parking area. Groundskeeping equipment is not figured in these costs.

(c) Operation and maintenance costs have not been estimated.

Sources:

1. MKGK, 1975, page 15.
2. Real Estate Research Corporation, 1974, page 130. Landscaping costs were judged to be the same per acre as for churches. Parking and landscaping figures were escalated at 10% over 1974 dollars.

Table VI - 24

HUMAN SERVICES COST ESTIMATES
(Per Capita Capital, Operation, and Maintenance Costs per Year for a Population Base of 10,000)

Item	Cost
Initial Capital Costs:	
Housing for the Elderly - 250 units x 800 square feet x $35.25 per square foot	= $7,050,000.00
Two Vans for transportation services x $15,000.00	= 30,000.00
Cemeteries	70,440.00
Total Initial Capital Costs	$7,150,440.00
Total Initial Capital Costs Per Capita	$ 715.04

Item	Cost	
Annual Operating and Maintenance Costs		
	10,000 Population	Per Capita
Mental Health	$ 122,500.00	$ 12.25
Developmental Disabilities	28,800.00	2.88
Physical Rehabilitation	25,000.00	2.50
Social Services	896,500.00	89.65
Public Health	92,277.00	9.23
Elderly Services	417,156.00	41.72
Juvenile Corrections	180,225.00	18.02
Adult Corrections	525,600.00	52.56
Total Operation and Maintenance Costs	$2,288,058.00	$228.81

Source: Drawn from information in Chapter V: Demand and Cost Projections for Housing and Municipal and Human Services.

15. Interest on General Debt

It is assumed that local debt would accumulate for solid waste, open space and recreation, government regulation, police, fire, library, and health and medical capital costs. These costs total to $581.05 per capita. At 9.5% per year the debt service would total $55.20 per capita. Debt service costs are included in total per capita costs given in Table VI-26. Tables VI-25 through VI-27 summarize costs estimated in this chapter.

Table VI - 25

ITEMIZED ESTIMATES OF MUNICIPAL AND HUMAN SERVICES COSTS

(Per Capita Capital, Operations, and Maintenance Costs
per Year for a population base of 10,000)

	Estimated Costs Per Year	
	Capital & One-Time Front End Costs	Operation % Maintenance Cost Per Year
1. Transportation		
Municipal Streets and Roads	1,193.00	
State and County Highways	2,246.00	87.19
2. Schools		
Nursery	111.00	29.21
Elementary	778.00	179.58
Junior and Senior High School	796.00	146.37
Vocational-Technical programs	542.40	109.72
Higher Education	199.30	74.48
3. Water System	257.00	18.44
4. Sewerage	277.00	13.52
5. Storm Drainage	93.75	. . .
6. Solid Waste	9.02	10.05
7. Open Space and Recreation	242.00	17.50
8. Government Regulation	22.50	50.53
9. Growth Planning and Consultation	214.97	. . .
10. Police	19.21	20.12
11. Fire	96.28	24.77
12. Library	48.00	7.40
13. Health and Medical	137.00	74.17
Other Human Services		
14. Mental Health		12.25
15. Developmental Disabilities		2.88
16. Physical Rehabilitation		2.50
17. Social Services		89.65
18. Public Health		9.23
19. Elderly Services	708.00	41.72
20. Juvenile Corrections		18.02
21. Adult Corrections		52.56
22. Cemeteries	7.04	. . .
23. Interest on General Debt		55.20
24. Other (5% of 1147.06 total o/m)		57.35
TOTAL	7997.47	1204.41
TOTAL LESS STATE AND COUNTY HIGHWAYS	5751.47	

Table VI - 26

TOTAL PER CAPITA ESTIMATED COSTS ASSOCIATED WITH THREE DEVELOPMENT PATTERNS

Type of Development	I. Low Density Sprawl(a) (no planning)	II. Managed Growth (Expansion of Existing Towns)	III. New Town
Municipal Utilities Municipal Streets and Roads, Water, Sewer, Solid Waste, Cables, Storm Drainage	2,590[1] 42% >II	1,830[2]	4,480[3] 2.45 x II
Public Schools	1,574	1,574	1,360
Vocational – Technical	542	542	542
College	199	199	199
Nursery	111	111	111
Other Human Services	572	572	860
Elderly Services	708	708	708
Growth Planning and Consultants	–	215	140
Sub-total	6,296 12% II	5,751	8,400 49% II
Residential Housing Costs	14,246 50% II	9,497	9,497
Sub-total	20,542 36% II	15,248	17,897 18% II
State and County Highways	2,246	2,246	2,246
Grand Total	22,788 30% II	17,494	20,143 15% II

Note: (a) The Real Estate Research Corporation's study, The Costs of Sprawl, describes six community development patterns including planned mix, combination mix with 50 percent PUD, 50 percent sprawl, sprawl mix, low density planned, low density sprawl and high density planned. Costs for municipal services in a sprawl situation are estimated to be 42% greater than in a combination mix with 50% PUD and 50% sprawl.

Sources:
1. Real Estate Research Corporation, 1974, pages 106-131.
2. Based on Table I-3.
3. C-b staff estimates.

Table VI - 27

ESTIMATED TOTAL MUNICIPAL SERVICES COSTS RELATED TO PERMANENT TRACT C-b POPULATION IMPACT

(Per capita capital, operation, and
maintenance costs for 6280 people)

	Estimated Costs Per Capita	
Services	Capital & One-Time Front End Costs	Operation & Maintenance
Summary		
TOTAL PER CAPITA	$ 7,997.47	$ 1,204.41
Per Capita Excluding State and County Capital Costs	5,751.47	
Total Costs for 6280 Population Excluding State and County Roads	36,119,231.60	
Total Costs for 6280 Population	50,224,111.60	7,563,694.80
Total Per Basic Job Cost at 5.36 Persons Per Basic Job Without State and County Highways	30,827.88(a)	
Total Per Basic Job Cost at 5.36 Persons Per Basic Job	42,866.44	6,455.64

Notes: (a) 6280 people divided by 1172 workers = 5.53 x $5,751.47 = $30,827.88

CHAPTER VII

IMPACTS OF THE PROPOSED ACTION ON THE REGIONAL ECONOMY

CHAPTER VII IMPACTS OF THE PROPOSED ACTION ON THE REGIONAL ECONOMY

A. Introduction

This chapter analyzes the economic impact of the proposed project in terms of employment and income patterns, changes in the structure of the local economy and increased public revenues.

One of the most fundamental impacts which the proposed action will have on the surrounding area will be the effect on employment patterns. A great many new job opportunities will be created in the form of direct project-related employment, indirect service employment and new secondary industries associated with oil shale production. Traditional employment patterns in the counties will be significantly altered, with the construction and mining sectors of the local economy assuming a far more important role in the regional economy than they previously held. The impact of these changing patterns will be felt not only in the actual numbers of jobs created, but also in the relative wage scales which the new jobs will offer. Wages and salaries for construction and plant workers will be higher than those currently paid in the area.

In addition to the creation of new job opportunities, the proposed action will make a substantial contribution to public revenues at the state and local level. The counties impacted by oil shale in terms of population growth and needed expansion of county services will experience county revenue increases primarily through increased sales and use tax and property tax revenues. The proposed action will yield revenues to the state directly and the counties indirectly through an increase in income taxes paid by the direct employees of the proposed project. In addition, the state and impacted counties have received and are receiving monies from the funds paid by the Lessee for the Lease to develop the oil shale deposits on the Tract.

While there is a need for the development of suitable mechanisms to equalize the revenues between political subdivisions in order to match revenues and impact, and a need to provide front end funds in a timely fashion to finance municipal expansion before a sufficient tax base has been established, the analysis suggests that overall public revenue from the project will be significantly in excess of the impact costs. The problems of socio-economic impact, therefore, are primarily ones of the need for improved methods of revenue sharing, timing, and efficient management, rather than fiscal inadequacy.

1. Impact on Employment and the Structure of the Local Economy

The three main phases of the proposed project will have widely varied employment requirements. Generally, Phase I (Mine Development) will have lesser requirements than Phase II (Plant Construction) or Phase III (Plant Operation). In Phase I the number of jobs will vary from 425 in Year 2 to 59 in Years 4 and 5. Phase II, the Plant Construction Phase, will require 775 workers in Year 1 and a high of 3,325 in Year 3. Employment requirements during the Plant Operations Phase will level off to a range from 1,026 in Year 2 to 1,172 in Years 11 through 22.

A comparison of these figures with those reflecting total employment in the three counties gives some indication of the significance of the proposed project. Estimated 1975 total employment is: Garfield County - 9,979; Mesa County - 27,000; and Rio Blanco County - 2,508 (see Tables VII-1,2 and 3). Considering that the Tract is in Rio Blanco County and that Rio Blanco County will receive the majority of the induced population, it is that county's employment patterns which will be most dramatically altered. The permanent employment in Phase III will increase the total county employment by more than 30% and would make oil shale production one of the most significant basic industries in the county and the region.

The first five years of the proposed action, Mine Development, Phase I, will see the addition of a maximum of 425 jobs. Most jobs during Phase I will be temporary, with the exception of between 5 and 59 mining personnel. These pilot mining personnel will become permanent mine operations' employees after Phase I. Current figures on the number of persons employed by sector in Rio Blanco County are not available. However, compared to the 1970 figures for Rio Blanco County which show mining and construction employment to be 280 and 152, respectively, the addition of 425 jobs in these sectors would be significant.

Agricultural employment in recent years has declined in importance relative to other sectors of the local economy. The percentage of the labor force in Rio Blanco County employed in agriculture dropped from 26.3 percent in 1950 to 15.1 percent in 1970. In Garfield County the percentage dropped from 30.1 percent to 9.5 percent during the same period. This trend is projected to continue. Thus the addition of some 425 employees to the mining and construction industries would undoubtedly cause these sectors to surpass agriculture in total employment by the end of Phase I.

Phase II, Plant Construction, will require the greatest number of new employees. Again, most of these jobs will be temporary, although the number of permanent operations' personnel will build up from 70 to 775 by Year 1 of Phase II. At the peak in Year 3, 3,325 persons will be employed in jobs associated with the proposed action. The project work force of 3,325 is one third larger than the total labor force now employed in Rio Blanco County. By Year 4 of the construction phase total employment in the county, excluding oil shale development, will have increased substantially.

Employment in the Plant Operations Phase, Phase III, will stabilize between 1,093 and 1,172 during the 22 year operating period. These will be permanent plant and mine jobs as compared to the limited

Table VII - 1

ESTIMATED EMPLOYMENT AND INCOME LEVELS IN GARFIELD COUNTY – 1975
(1975 DOLLARS)

Sector	Employees	Income Rate	Total Income
Agriculture	600[1]	$ 9,753[2]	$ 5,851,800
Mining		16,906	
Construction		13,007	
Manufacturing		8,845	
Transportation, Communication & Utilities		9,434	
Wholesale and Retail Trade		6,894	
Services		7,154	
Health Service		7,805	
Education		9,105	
Welfare and Miscellaneous Profession		11,706	
Public Administration	(Total non-agriculture 8,379)	8,455	(Total non-agriculture 93,363,695)
Total	9,979		99,218,495
Total Unemployed	341		
Unemployment Rate	3.4%		

Sources: 1. Phone interview with the Colorado Department of Labor, October, 1975.
2. Phone interview with Jack Gilmore of Denver Research Institute, October, 1975.

Table VII - 2

ESTIMATED EMPLOYMENT AND INCOME LEVELS IN MESA COUNTY (1975 DOLLARS)

Sector	Wage Salary Employees	Income Rate	Total Income
Agriculture	2,100[1]	$ 9,084[2]	$ 19,076,400
Mining		11,986	
Construction		13,008	
Manufacturing		8,869	
Transportation, Communication & Utilities		11,073	
Wholesale and Retail Trade		7,149	
Services		8,170	
Health Service		8,331	
Education		9,084	
Welfare and Miscellaneous Profession		12,363	
Public Administration	(Total non-agriculture 24,900)	9,138	(Total non-agriculture 277,059,163)
Total	27,000		296,135,563
Total Unemployed	1,050		
Unemployment Rate	4.0%		

Sources:
1. Phone interview with the Colorado Department of Labor, October, 1975.
2. Phone interview with Jack Gilmore of Denver Research Institute, October, 1975.

Table VII - 3

ESTIMATED EMPLOYMENT AND INCOME LEVELS IN RIO BLANCO COUNTY (1975 DOLLARS)

Sector	Wage Salary Employees	Income Rate	Total Income
Agriculture	350[1]	$11,718[2]	$ 4,101,300
Mining		13,008	
Construction		9,621	
Manufacturing		10,911	
Transportation, Communication & Utilities		11,986	
Wholesale and Retail Trade		6,773	
Services		5,859	
Health Service		7,794	
Education		9,782	
Welfare and Miscellaneous Profession		10,428	
Public Administration	(Total non-agriculture 2,158)	7,794	(Total non-agriculture 22,749,340)
Total	2,508		26,850,640
Total Unemployed	65		
Unemployment Rate	2.6%		

Sources: 1. Phone interview with the Colorado Department of Labor, October, 1975.
2. Phone interview with Jack Gilmore of Denver Research Institute, October, 1975.

duration jobs of the development and construction phases. The employment trends developed during the Plant Operations Phase will influence the overall economy much more than will the temporary construction jobs. The mining sector will become the largest single sector in terms of employment and income.

The new employment opportunities and higher wage scales guaranteed by the proposed project will benefit not only the region, but the state as a whole. The Operator is committed to a policy of maximizing local participation in the work force associated with the project, through early local recruiting efforts, special programs to upgrade skills where necessary, and early planning with the local educational institutions to develop occupational training programs. A joint industry/school committee currently exists, whose purpose is to examine the anticipated need and develop such training programs. Local labor is expected to be provided by a combination of persons who are currently employed in the necessary occupational skill areas, those employed but possessing underutilized or nonutilized skills, and those who are unemployed.

An opinion survey of the three county region reported that many residents felt that jobs are difficult to get and wages lower than elsewhere in the state. The study found that 38 percent of the residents felt they possessed nonutilized occupational skills. Residents in the following occupations more frequently felt they had nonutilized skills: operatives, construction workers, craftsmen, carpenters, professional workers, mechanics and repairmen.

Incomes in the region have shown steady improvement in recent years, however, the rate of increase has been lower than for the state as a whole. Employment has improved in the last few years and the current rates of unemployment in Garfield and Rio Blanco counties, 4.7 percent and 2.8 percent respectively, compare favorably to the state level of 4.7 percent (May 1975 figures). The effects of the proposed action upon local unemployment rates specifically are uncertain, because the characteristics of the present labor force are unknown.

Since many of the employment opportunities associated with the project will be appropriate for the type of skills residents now report as underutilized, it appears likely that refresher programs to upgrade skills may be quite effective in increasing local participation in the new work force. Anticipated employment of local residents on the proposed project is estimated at 25 percent of required construction workers and 38 percent of operation personnel. This will mean that approximately 838 construction personnel and 445 operations personnel will be local residents.

As discussed in previous chapters of this report, employment directly required by the proposed action represents only a portion of the total induced employment. The remainder takes the form of service employment generated by the proposed project construction and operations personnel. The extent of this service employment has previously been described. With respect to this discussion, it should be noted that overall employment and income patterns in the affected area will be further changed by the addition of the service employees induced by the proposed action and employees of the secondary new industries associated with commercial oil shale production, such as goods movement, warehousing, machine maintenance and parts and materials supply.

2. Wage Scales

Beyond simply adding a great many new jobs to the local economy, the proposed action will also generate new wage scales which will be uncharacteristically high for Rio Blanco County. Estimated average annual income of persons in the construction sector in Rio Blanco County is currently $9,621. Construction workers employed by the proposed project will earn from $17,000 to $24,000 annually. Persons in the mining sector in the county, including all types of workers, now earn an average of $13,008 per year. Projected annual incomes for non-supervisory mining employees in the Plant Operations Phase range from $14,000 to $15,000. Annual salaries for management personnel will average over $20,000. All of these figures are calculated in 1975 dollars with no compensation made for inflation or productivity raises which might occur in the future.

The average annual incomes for persons in the mining and construction sectors are presently higher than those of any other industry. The proposed action will further raise the average income in the mining and construction industries, and indirectly affect salaries in other sectors.

An inflationary trend has recently been associated with major energy development projects such as the proposed action. The combination of greatly increased employment opportunities and higher-than-average wage scales has a marked inflationary affect upon local economic conditions. The increased demand for goods and services, combined with higher levels of disposable income, tends to inflate local prices. This pattern is particularly acute when the local service infra-structure fails to develop at a rate adequate to meet the increased demand.

One purpose of comprehensive community planning is to minimize this wage-price spiral by facilitating development of local services in a timely fashion. Furthermore, the opportunity for higher-than-average wage scales may attract a significant number of local residents away from lower paying jobs in the traditional sectors, such as agriculture, trade and government, to better paying jobs in the oil shale industry. To fill the positions vacated by these residents, salary levels in the lower paying sectors must be raised commensurately. The effect of this will be to increase the overall costs of local government. However, this same trend will also have the positive impact of bringing local income levels in line with state averages.

Another indicator of the impact of the proposed action on the structure of the local economy and the relative significance of different economic sectors is the total annual income from wages and salaries. Total income in Rio Blanco County in 1975 is estimated to be about $26,850,000. Total non-agricultural income is approximately $22,750,000. The respective figures for Garfield County are $99,218,495 in total income and $93,363,695 in non-agricultural income.

Total annual wages paid to the employees of the proposed project are estimated to be maximum of $7,419,948 in Phase I (Year 2), $66,467,821 in Phase II (Year 7), and $17,216,112 in Phase III (Years 22-30). Wages paid to employees of the project in Year 1 alone will be greater than the current total wages paid in the agricultural sector ($4,101,300) of Rio Blanco County (see Tables VII-1, 2 and 3). That the proposed action will make a major contribution to personal income in the three county region is clearly illustrated. The total cumulative wages paid for the entire proposed project is estimated to be $548,573,020.

3. Impact on Public Revenues

a. Special Oil Shale Lease Fund

Under the Federal Prototype Oil Shale Leasing Program, the Lessee of the Tract contracted to pay a total of $117,800,000 in lease monies to the federal government for the right to mine oil shale located on the Tract. The total fund is to be paid in 5 equal payments with the right to deduct from the last 2 payments certain development-related costs. Under the Federal Prototype Oil Shale Leasing Program, 37 1/2 percent of the funds are returned to the state to assist in funding schools and roads in the impacted counties, and the administration of the state program. As of fiscal year 1975-1976, Colorado has received the first 2 payments of its 37 1/2 percent share of the total $307,920,760 contracted by the Lessees of both Tracts C-a and C-b. This amount is calculated as follows:

2/5 x 37 1/2 x 307,920,760 = $46,188,114.05

The sum of $46,188,114.05 is the total amount received by the state as of 1975. Of this fund, the state appropriated $451,187 for use in fiscal year 1974-1975. These figures are displayed in Table VII-4. The appropriation for fiscal year 1975-1976 was $10,385,310 and generally went directly to counties as shown in Table VII-5. In addition to these specific county loans and grants, funds for a technical assistance program and program administration are shown in Table VII-5. The actual granting and use of some of these funds is contigent upon local approval of local project expenditures. It is possible that some of these specific appropriations may not ultimately be made.

The Lease Fund of the state is in an interest-bearing bank account. The interest accruing is placed in a separate fund which is available for appropriation by the Colorado General Assembly for any purpose

Table VII - 4

STATE APPROPRIATIONS FROM FEDERAL PROTOTYPE OIL SHALE LEASING PROGRAM FOR SCHOOLS, ROADS AND PROGRAM ADMINISTRATION IN COLORADO
(fiscal year 1974 - 1975)

Item	Amount
Office of the Oil Shale Coordinator	$ 87,187.00
Education	
Mobile Classrooms	60,000.00
Student Increases	144,000.00
Planning and Coordination	
Schools	60,000.00
Regional, City and Town	50,000.00
Transportation	50,000.00
TOTAL	$451,187.00

Source: Phone interview with a spokesman for the Colorado Legislative Council, October, 1975.

Table VII - 5

STATE FUNDING FOR SCHOOLS, BRIDGES, ROADS, AND WATER FACILITIES IN FIVE COUNTIES
(Fiscal Year 1974-1975)

Recipient	Mesa	Rio Blanco	Garfield	Moffat	Routt	5-County Region
Schools						
District RE-51	$ 400,000					$ 400,000
District RE-49	36,000					36,000
District RE-1		$1,189,000				1,189,000
District RE-4		10,000				10,000
District RE-2			$1,000,000			1,000,000
District RE-16			121,057			121,057
District RE-1			200,000			200,000
District RE-1				$670,000		670,000
Roads and Bridges						
Roan Creek Road	467,595					467,595
DeBeque Bridge	299,658					299,658
Piceance Creek Road		2,200,000				2,200,000
Bonanza Road		171,000				171,000
Rulison Bridge			471,000			471,000
County Roads					$100,000	100,000
Water Projects(a)						
Meeker		900,000				900,000
Rangely		600,000				600,000
City of Rifle			400,000			400,000
Carbondale			800,000			800,000
City of Hayden					50,000	50,000
Miscellaneous						
Technical Assistance						200,000
Program Administration						100,000
Total	$1,203,253	$5,070,000	$2,992,057	$670,000	$150,000	$10,385,310

Note: (a) These funds were loaned to the counties. The funds were transferred from the Lease Fund account to the Colorado Water Conservation Fund which loaned the money for the projects. The funds are to be repaid to the Lease Fund. Transfer of funds has not been completed on all loans.

desired. The state has taken the position that the interest accruing from the fund is not subject to the school and road expenditure restriction placed upon the fund itself. None of these interest funds have been appropriated to date. The state has predicted that the Lease Fund will draw interest at an average rate of 10 percent per year. Approximately $2,400,000 has been earned to date.

The state disposition of these lease funds in the future is undetermined at this time although the fund is generally to be expended to aid the oil shale impacted counties' schools and roads. The total lease money guaranteed to the state of Colorado is 3 yearly payments, of approximately $72,000,000. Colorado's share of the payments for the 4th and 5th years of Phase I is subject to depletion by the allowable deductions by Lessees for operational expenses mentioned above.

b. Individual Property Taxes

The increase in local property tax revenues should be divided into 2 categories. The first category involves taxes to be paid by the individuals who will be involved directly and indirectly in a service capacity and in the development and operation of the proposed action. The second involves the property taxes to be assessed against and paid on the Tract itself as well as the improvements made thereon. Property tax revenues go to and are used by the county in which the property is located.

The first category is very difficult to deal with, as the number of new sources of property tax revenues is impossible to ascertain. To the extent that the plant workers and staff utilize presently existing homes and properties, there will be no tax impact since the property tax is being paid currently by the present owner. The property tax impact will occur only when new homes are constructed or brought in, and existing property is improved. This would result in an increased valuation for assessment. Although some individual property tax impact is certain, calculation of the magnitude of the impact is necessarily an estimate.

The new and improved homes will include single family units, multiple family units and mobile homes. The permanently constructed units and all mobile homes which are permanently attached to a foundation are assessed for taxation valuation at 30 percent of their market values. The applicable mill levy rate is then applied to compute the tax due. Mobile homes not attached to a foundation are not subject to property taxes, but instead are subject to a special license plate fee (SME license fee). This fee is calculated at 2.1 percent of the market value of the mobile home the first year- with a declining rate thereafter down to .5 percent.

New single family units are estimated to cost an average of $40,200. Multiple family units will cost an average of $21,505 per unit. Mobile homes are expected to have an average cost of $13,450.

As is shown in Table VII-6 the individual property taxes to be paid by the total induced population will vary from approximately $246,924 in the 2nd year of Phase I to approximately $2,408,909 in the 3rd year of Phase II, and thereafter, with an average of approximately $1,450,021 in Years 1-22 of Phase III. These figures are given in 1975 dollars, with no inflation factors. This analysis also does not include appreciation in the market value of new homes.

c. Corporate Property Taxes - Values of Property for Assessed Valuation

The second category, property taxes generated from the proposed project facility, is amenable to a more specific analysis. Property taxes are computed by applying an assessment formula to the actual value of property (30 percent in most cases), and then applying the applicable mill levy rate to that figure. For purposes of computing property taxes on a proposed project facility, the property falls into specific categories, which are subject to the assessment formulations shown in Table VII-7. These categories are discussed below.

(1) Producing Mines and Minerals

The Lessee of the Tract estimates a mining rate of 21,681,000 tons of oil shale per annum, at an average oil-bearing rate of 35 gallons per ton. Including the volume loss due to the hydrotreating process, a total of 15,700,000 barrels of hydrotreated oil per annum or approximately 43,000 barrels per day will be commercially produced. This is assumed to be sold for an average of $11.50 per barrel. Figuring the cost of producing hydrotreated oil at $4.77 a barrel and the capital debt service cost at $5.00 per barrel (both amounts excluded from the legal definition of gross proceeds) the gross proceeds per barrel would be $1.73. Applying the assessment rate for gross proceeds of 25 percent, the assessed valuation of the oil shale production of the proposed project would be:

15,700,000 barrels x 1.73 x 25 percent = $6,790,250.00

(2) Freeport Merchandise and Inventory Held for Resale

In connection with the proposed project facility, this category would include storage of hydrotreated oil for resale. This is assumed to average 96,000 barrels per month at a value of $11.50 per barrel. This would result in the following assessed valuation:

96,000 barrels x $11.50 x 5 percent = $55,200.00

In addition, an average inventory of 165,000 barrels of raw oil shale

Table VII-6
INDIVIDUAL PROPERTY TAXES ASSESSED ON PROPERTY OF TOTAL INDUCED POPULATION

Development Stages	Phase Year	Cumulative Year	Number[(a)] Single Family Units	Revenue[(b)]	Number Multi-Family Units	Revenue	Number Mobile Home Units	Revenue	Yearly Total Revenue
Phase I	1	1	0	0	0	0	0	0	0
Mine	2	2	96	99,567	51	28,296	349	119,061	246,924
Development	3	3	94	97,493	50	27,741	314	96,714	221,948
	4	4	40	41,486	20	11,097	18	4,939	57,522
	5	5	40	41,486	20	11,097	18	3,728	56,311
Phase II	1	6	176	182,540	94	52,154	636	217,277	451,971
Plant	2	7	528	547,620	280	155,352	1,762	580,567	1,283,539
Construction	3	8	1,023	1,061,015	540	299,608	3,305	1,048,286	2,408,909
	4	9	979	1,015,380	514	285,182	2,970	856,604	1,948,526
Phase III	1	10	795	824,542	398	220,822	927	254,249	1,299,613
Operation	2	11	951	986,339	470	260,770	656	157,935	1,405,044
	3	12	951	986,339	470	260,770	656	135,877	1,382,986
	4	13	951	986,339	470	260,770	656	135,877	1,382,986
	5	14	951	986,339	470	260,770	656	135,877	1,382,986
	6	15	977	1,013,305	483	267,982	674	139,605	1,420,892
	7	16	996	1,033,011	492	272,976	687	142,265	1,443,252
	8	17	1,004	1,041,309	496	275,195	692	143,334	1,459,838
	9	18	1,004	1,041,309	496	275,195	692	143,334	1,459,838
	10	19	1,004	1,041,309	496	275,195	692	143,334	1,459,838
	11	20	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	12	21	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	13	22	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	14	23	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	15	24	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	16	25	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	17	26	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	18	27	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	19	28	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	20	29	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	21	30	1,020	1,057,903	504	279,634	703	145,646	1,483,183
	22	31	1,020	1,057,903	504	279,634	703	145,646	1,483,183

Notes: (a) The number and value of all housing units is based on C-b staff estimates.

(b) Taxation of the units is based on 30% of the units value x 86 mills for all single, and multiple family units and for half of the mobile homes. The other half of the mobile homes are taxed accordingly with the Colorado Division of Property Taxation rates varying from 2.1% to .5% of value over a period of five years. Mobile homes taxed at this rate are not considered permanent housing units.

The mill levy used for the latter calculations is an average of the Rifle mill levy 91.29 and the Meeker mill levy 79.82.

Source: Based on C-b staff estimates.

Table VII - 7

PROPERTY CATEGORIES, ASSESSMENT METHODS AND RATIOS OF TAXATION ON MINING AND RELATED PROPERTIES IN COLORADO (1974)

Category	Assessment Method/Ratio
1. Producing mines and minerals	Greater of net proceeds, 25% of gross proceeds from extraction during previous year. 'Gross proceeds' = gross value of product after extraction excluding cost of treatment, reduction, and sale of ore, or by-products.
2. Freeport merchandise and Inventory held for Resale	5% actual value
3. Mobile equipment	30% (alternatively taxable under motor vehicle licensing laws) of actual value based on manuals of fixed prices.
4. All other property	30% of actual value by market, income or installed value methods.

Source: Governor's Committee on Oil Shale Environmental Problems, 1974, pages C-1 – C-8.

valued at $8.00 per barrel would exist at the Tract, resulting in the following valuation;

165,000 barrels x $8.00/barrel x 5 percent = $66,000

(3) Mobile Equipment

Assuming mobile plant and mine equipment of an actual value of $19 million (determined by reference to Colorado "Mobile Equipment Manual" based on factory list prices), the following assessed valuation would result:

$19 million x 30 percent = $5,700,000.00

(4) All Other Property

Stockpiled Ore - The valuation of stockpiled ore is troublesome in that it is to be valued at market value where no market value may actually exist and there are no comparable products to use for comparison.

Coarse Ore - The coarse ore stockpile will build up to 5 million tons prior to commercial production and will be reduced to 500,000 tons after 2 years of commercial production, remaining constant at that level. The cost of producing coarse ore is assumed to be $.85/ton.

An accepted method of ascertaining market value of a produced material is to determine production cost and to add to that figure a reasonable profit percentage. Using this method, and using a profit percentage of 8.5 percent of costs, yielding a value of $.72 per barrel profit, the assessed valuation would be:

5,000,000 x ($.85 + $.072) x .30 = $1,383,000.00

After 2 years of Phase III (Operation) the pile will consist of 500,000 tons and the assessed value will equal $138,300.

Fine Crushed Shale - The fine crushed shale pile will be 14,000 tons. The cost of production is assumed to be $1.03 per ton. Using the market value formula stated above, the assessed value of this pile throughout the life of the project will be:

14,000 x ($1.03 + $.088) x .30 = $4,696.00

The total valuations for assessment are displayed in Table VII-8.

Using the 1975 mill levy of 5.32 which is applicable to the area in which the proposed project is located and applying this to the assessed valuation for the type of property listed in Table VII-8, the taxes on this property for the first two years of Phase III, excluding the values for other Tract property, will be:

$13,999,146 @ .05132 = $718,436.00

After the second year of Phase III, and for the duration of the proposed project the assessed valuation will be decreased by $1,244,700 due to the reduced stockpile of coarse ore. This will result in an assessed valuation of $12,754,446, and the tax value will be:

$12,754,446 @ .05132 = $654,558

Other Plant Site Categories - The remaining property subject to property taxation under Colorado law, including the proposed facility and improvements, will provide the largest proportion of the total taxes to be paid on the proposed project. Precise valuation of this property at the present time is impossible, due to the unresolved legal nature of some types of property and the possibility of an adjustment of the applicable mill levy rate for the reasons discussed below. The best estimate of the taxes to be due on this property is shown in Table VII-9. Combining these figures for the property taxes owing for other Tract properties, the total amounts, by year, are outlined in Table VII-10.

These are tentative figures. The ultimate amount to be paid will depend upon final determination of the property to be taxed, and the possibility of a lowering of the applicable mill levy rate. Colorado law provides that a county is limited to a yearly general revenue income of 105 percent of the previous year's revenues. This limitation may be waived either by approval of the local electorate through a general vote or by the Colorado Division of Local Government upon a showing of need. Since an increased population and need for increased services will certainly be shown by Rio Blanco County, this limitation may be waived. But, the ultimate amount of needed new revenues will be determined as the need arises, and a decrease in the mill levy rate certainly is possible.

d. Sales and Use Taxes, Income Taxes

The following analysis does not consider the increase in state revenues attributable to the corporate income taxes to be paid by the corporate Lessee. These revenues will be in addition to those personal income taxes and total sales and use taxes projected below.

Table VII - 8

PROJECTED TRACT C-b PROPERTY VALUATIONS FOR TAX ASSESSMENT – YEARS ONE AND TWO OF PHASE III

Property Type	Value
Producing Mine	$ 6,790,250
Inventory held for Resale	$ 121,200
Mobile Equipment	$ 5,700,000
Stockpiled Coarse Ore	$ 1,383,000
Stockpiled Fine Crushed Ore	$ 4,696
TOTAL	$13,999,146

Source: C-b Staff Estimates.

Table VII - 9

PROPERTY TAX ESTIMATES FOR TRACT C-b PHASES II AND III

Phase Year	Project Year	Tax Amount (yearly)
Phase II		
Year 1	6	$ 228,265
Year 2	7	$ 981,658
Year 3	8	$2,521,856
Year 4	9	$5,133,599
Phase III		
Years 1–22	10–31	$5,913,603

Source: C-b Staff Estimates

Table VII - 10

TOTAL PROPERTY TAX ESTIMATES FOR TRACT C-b – PHASE I-III

Phase Year	Project Year	Tax Amount (yearly)
Phase I		
Years 1–5	1–5	–0–
Phase II		
Year 1	6	$ 228,265
Year 2	7	$ 981,658
Year 3	8	$2,521,856
Year 4	9	$5,133,599
Phase III		
Year 1	10	$6,568,161
Year 2	11	$6,568,161
Years 3–22	12–31	$6,568,161

Source: C-b Staff Estimates

The method used to project future revenues from existing figures was obtained from the Research and Statistics Section of the Colorado Department of Revenue. The Colorado state sales tax (3 percent) goes to the state. Local municipal sales and use taxes, generally 1 percent, go to the municipality. An average sales tax figure of 3 1/2 percent was used here, to include one-half of 1 percent collected by the taxing municipalities (including Meeker and Rangely). All state income tax revenue goes to the state of Colorado.

The taxes to be generated come from two distinct revenue sources: employee wages and corporate expenditures (non-wages). Employees' wages are taxed immediately by the state and those wages are expected to be spent in the impacted area. The introduction of these new monies into the local and state economies will result in a greater overall impact than the wage dollar amount. For the purpose of this analysis, it was presumed that each new dollar would turn over in the economy 3 times. This factor, the income multiplier, is an indication of the indirect impact of increased revenues in an area. The dollar is subject to taxation each of the times it turns over. Table VII-11 shows the net revenues to be generated by income and sales and use taxes on employee salaries for the life of the proposed project. These revenues vary considerably from year to year depending upon the constructon and operation phases (Phases II and III) of the proposed project, starting in Year 1 of Phase I. The formula for determining total revenue generating from employee wages on the project is shown in Figure VII-1.

Non-wage corporate expenditures will also yield a revenue increase due to sales and use taxes. During Phase II, the Construction Phase of the proposed project, materials will be purchased by the Lessee upon which approximately $8,130,000 in sales and use taxes will be paid. It is presently anticipated that approximately 25 percent of the total material purchased will be purchased in Colorado or will be subject to Colorado's sales or use tax, resulting in a total Colorado state sales tax revenue of $2,032,500 during the Construction Phase. After initial construction and during the operational life of the project, expenditures will be made on a routine basis for materials and equipment. Table VII-12 shows the amount of these expenditures.

All or nearly all of these materials are expected to be purchased in Colorado. Using an average sales tax rate of 3.5 percent, this would lead to annual state sales tax revenue of approximately $806,400, beginning when the proposed project reaches the Operation Phase in Year 1 of Phase III.

The total sales taxes to be paid upon non-wage corporate expenditures by year are displayed in Table VII-13. The estimated effect of property, income, sales and use taxes on the state revenue from the proposed project is shown in Table VII-14.

Table VII - 11

ESTIMATED AFFECT ON COLORADO STATE REVENUES FROM TRACT C-b DEVELOPMENT (WAGES)

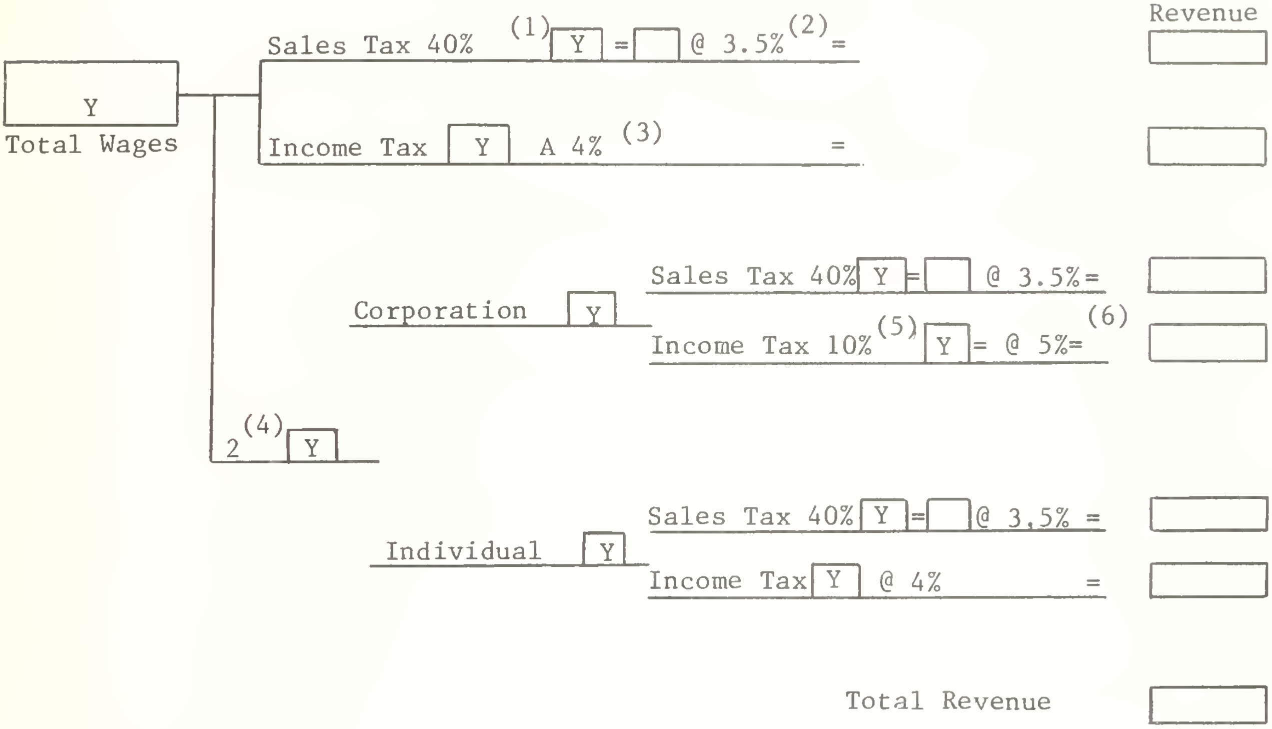
	Phase Year	Cumulative Years	Estimated Total Yearly Wages to Be Paid(a)	Sales and Use Tax Revenue	Income Tax Revenue	Total Revenue(b)
Phase I	1	1	–	–	–	–
Mine	2	2	$ 7,091,362	$ 297,837	602,766	$ 900,603
Development	3	3	7,419,948	311,638	630,696	942,333
	4	4	940,344	39,494	79,929	119,424
	5	5	940,344	39,494	79,929	119,424
Phase II	1	6	11,349,278	476,670	964,689	1,441,358
Plant	2	7	32,367,041	1,359,416	2,751,198	4,110,614
Construction	3	8	66,467,821	2,791,648	5,649,765	8,441,413
	4	9	49,133,861	2,063,622	4,176,378	6,240,000
Phase III	1	10	17,908,133	752,142	1,522,191	2,274,333
Operation	2	11	16,049,172	674,065	1,364,180	2,038,245
	3	12	16,049,172	674,065	1,364,180	2,038,245
	4	13	16,049,172	674,065	1,364,180	2,038,245
	5	14	16,049,172	674,065	1,364,180	2,038,245
	6	15	16,493,052	692,708	1,401,909	2,094,618
	7	16	16,818,564	706,380	1,429,578	2,135,958
	8	17	16,951,080	711,945	1,440,842	2,152,787
	9	18	16,951,080	711,945	1,440,842	2,152,787
	10	19	16,951,080	711,945	1,440,842	2,152,787
	11	20	17,216,112	723,077	1,463,370	2,186,446
	12	21	17,216,112	723,077	1,463,370	2,186,446
	13	22	17,216,112	723,077	1,463,370	2,186,446
	14	23	17,216,112	723,077	1,463,370	2,186,446
	15	24	17,216,112	723,077	1,463,370	2,186,446
	16	25	17,216,112	723,077	1,463,370	2,186,446
	17	26	17,216,112	723,077	1,463,370	2,186,446
	18	27	17,216,112	723,077	1,463,370	2,186,446
	19	28	17,216,112	723,077	1,463,370	2,186,446
	20	29	17,216,112	723,077	1,463,370	2,186,446
	21	30	17,216,112	723,077	1,463,370	2,186,446
	22	31	17,216,112	723,077	1,463,370	2,186,446
TOTAL			$548,573,020	$23,040,067	$46,628,707	$69,668,774

Notes: (a) These calculations are based on a multiplier of 3, i.e., each new dollar will be turned over three times in the economy.

(b) Figures are given in 1975 dollars. Increases in these figures due to inflation or job-classification wage increases are not included as this rate of increase is not available.

FIGURE VII-1

FORMULA FOR DETERMINING TOTAL PUBLIC REVENUE GENERATED BY EMPLOYEE WAGES ON TRACT C-B


Revenue
Y
Total Wages
Sales Tax 40% (1) Y = @ 3.5% (2) =
Income Tax Y A 4% (3) =
Corporation Y
Sales Tax 40% Y = @ 3.5% =
Income Tax 10% (5) Y = @ 5% = (6)
2 (4) Y
Individual Y
Sales Tax 40% Y = @ 3.5% =
Income Tax Y @ 4% =
Total Revenue

This formula assumes the following:

(1) Assume that 40% of wages spent on items subject to sales tax.

(2) 3% Colorado sales tax imposed on all items subject to sales tax, assume that 50% of items bought subject also to 1% municipal sales tax.

(3) 4% used as personal income tax rate in Colorado.

(4) This indicates the 2nd and 3rd time the monies are passed through the economy, based on the multiplier of 3.

(5) Assume that 10% of corporate income is subject to Colorado Corporate income tax.

(6) 5% used as corporate income tax rate in Colorado.

(7) Assume that during 2nd and 3rd turnovers of monies in the economy, 1/2 goes to individuals and 1/2 goes to corporation.

Source: C-b Staff (Adapted from Colorado Department of Revenue research and statistics section).

Table VII - 12

PROJECTED TRACT C-B MATERIALS AND EQUIPMENT EXPENDITURES FOR PHASE III

Material or Equipment Type	Expenditure
Miscellaneous Materials (Catalysts, Chemicals)	$ 6,740,000
Maintenance Equipment	$ 5,500,000
Mining Supplies	$ 10,800,000
Total Operational Expenditures	$ 23,040,000.

Table VII - 13

PROJECTED SALES TAX ON NON-WAGE EXPENDITURES FOR PHASE II

Year	Amount
1980	$ 60,975
1981	$ 223,575
1982	$ 569,100
1983	$ 1,178,850
1984	$ 806,400

Table VII - 14

PROJECTED PROPERTY, INCOME, SALES AND USE TAXES GENERATED BY THE C-b PROJECT BY YEAR FOR A 31 YEAR PROJECT

Phase	Year	Cumulative Years	Rio Blanco Property Tax (on C-b Project) Collected[a]	Total Impacted Counties Property Tax - Individual Collected	Income Tax (Wages)	Sales & Use Tax		Total
						Wages	Non-wages	
Phase I	1	1	–	–	–	–	–	–
Mine	2	2	–	–	$ 602,766	$ 297,837	–	$ 902,603
Development	3	3	–	$ 246,924	630,696	311,638	–	1,189,258
	4	4	–	221,948	79,929	39,494	–	341,371
	5	5	–	51,522	79,929	39,494	–	176,945
Phase II	1	6	–	56,311	964,689	476,670	$ 60,975	1,558,645
Plant	2	7	$ 228,265	451,971	2,751,198	1,359,416	223,575	5,014,425
Construction	3	8	981,658	1,283,539	5,649,765	2,791,648	569,100	11,275,710
	4	9	2,521,856	2,408,909	4,176,378	2,063,622	1,178,850	12,349,615
Phase III	1	10	5,133,599	1,948,526	1,522,191	752,142	806,400	10,162,858
Operation	2	11	6,568,161	1,299,613	1,364,180	674,065	806,400	10,712,419
	3	12	6,568,161	1,405,044	1,364,180	674,065	806,400	10,817,850
	4	13	6,568,161	1,382,986	1,364,180	674,065	806,400	10,795,792
	5	14	6,568,161	1,382,986	1,364,180	674,065	806,400	10,795,792
	6	15	6,568,161	1,382,986	1,401,909	692,708	806,400	10,852,164
	7	16	6,568,161	1,420,892	1,429,578	706,380	806,400	10,931,411
	8	17	6,568,161	1,448,252	1,440,842	711,945	806,400	10,975,600
	9	18	6,568,161	1,459,838	1,440,842	711,945	806,400	10,987,186
	10	19	6,568,161	1,459,838	1,440,842	711,945	806,400	10,987,186
	11	20	6,568,161	1,459,838	1,463,370	723,077	806,400	11,020,846
	12	21	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	13	22	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	14	23	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	15	24	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	16	25	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	17	26	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	18	27	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	19	28	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	20	29	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	21	30	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
	22	31	6,568,161	1,483,183	1,463,370	723,077	806,400	11,044,191
			$146,796,759	$37,092,936	$46,628,714	$23,040,068	$19,773,300	$273,331,777

Notes: (a) The difference between the amount assessed and the amount collected reflects a one year lag between property tax assessment and collection. Taxes assessed in one year are collected and are part of the general county revenue the following year.

e. Summary

In 1975, the number of employed persons, by county, was as follows:

Rio Blanco - 2,508
Garfield - 9,979
Mesa - 27,000

When the project begins, the number of workers required, the total induced population, and the total employee salaries paid are as follows, by peak year during each phase:

Year	C-b Workers	C-b Salaries	Total Employment
Phase I Year 2 or 3 Mine Development	425	$ 7,419,948	637
Phase II Year 3 Construction	3,325	$66,467,821	6,650
Phase III Year 11 Operation	1,172	$17,216,112	2,930

The total cumulative wages paid on the project over the 30 year project life are $548,573,020, in 1975 dollars.

The total cumulative project-related expenditures over the 30 years equal $1,100,000,000, in 1975 dollars.

The total state and local tax revenues to be paid by the Tract workers, associated service personnel, staff and by the project itself, over 30 years, equal $273,331,777, in 1975 dollars.

As is shown in Table VII-15, the public revenues to be paid on the proposed project itself (excluding employee-related tax revenues) will equal, during operation, approximately 26 percent of the public revenues paid by the oil and gas industry throughout the state.

Table VII-15
COMPARISON OF PUBLIC REVENUES GENERATED BY THE OIL AND GAS INDUSTRY IN COLORADO IN 1974 AND THE PROPOSED PROJECT

Tax	The Project (In Commercial Production Stage) (1)	Total Colorado Oil and Gas Industry (1974) (2)
Gross Income Tax (Severance)	$ - 0 -	$ 3,000,000 (3)
Ad Valorem Tax (on production and all facilities)	6,568,161	20,508,049
Sales and Use Taxes	806,400 (4)	3,200,000
Total Public Revenue (5)	$7,374,561	$26,708,049

Notes:
(1) Production rate – 100,000 barrels per day of oil, 301,370 MCF per day of gas.
(2) Production Rate – 46,000 barrels per day of oil.
(3) In 1974-1975 dollars.
(4) This figure reaches $1,178,850 during plant construction.
(5) These figures do not include corporate or personal income taxes.

CHAPTER VIII

MITIGATION PROCEDURES

CHAPTER VIII MITIGATION PROCEDURES

A. Introduction

Mitigating socio-economic impacts related to oil shale development is the major concern of this chapter. Among the key ingredients of a successful mitigation program are effective relationships among all levels of government and between industry and government, as well as solutions to the problem of front-end financing for housing and services. This chapter reviews the socio-economic impacts associated with development of an oil shale plant. Further, it discusses the problems and prerequisites for successfully mitigating these impacts. The chapter also outlines the programs and processes currently underway at regional and local levels aimed at managing oil shale related impacts. Finally, the planning and procedures for mitigation that are being considered by the Operator are presented.

B. Projected Impacts

The projected impacts related to development of an oil shale plant for which mitigation procedures and alternatives need to be pursued can be summarized as the following:

1. Changes in life style including changes in dominant political attitudes and restrictions on independence of action;

2. Changes in population characteristics particularly related to increased density and crowding;

3. Greatly accelerated demand for housing and municipal and human services;

4. Changes in crime rates, increased incidence of personal trouble and increased demand for welfare;

5. Increased pollution, including that generated by industry and automobiles, as well as that resulting from complex sources;

6. Changes in land use, namely, removal of agricultural lands into industrial and residential uses; and

7. Changes in the economy and in the government and tax base of the area.

C. Problems and Prerequisites of a Mitigation Program

Some of these impacts can be successfully mitigated, others only can be organized better and some probably cannot be changed at all. Perhaps the greatest difficulty in mitigating boom growth is managing the problem of time. A successful mitigation program must have some advance notice of the scheduled influx of people, a commitment of financial support and a sufficient period in which to order materials and labor. In addition, adequate lead time is needed to complete permit applications and utility service orders as well as to resolve conflicts over land use and other issues.

A concern related to timing is the actual availability and supply of capital, materials, space, labor, power and personnel to manage a rapidly growing area. In addition to the difficulties of mitigating rapid growth situations, namely, time and availability of necessary materials and supplies, there are problems common to any development. For example, the Colorado West Area Council of Governments' 1974 study The Future of a Region notes four principal factors of concern in choosing land suitable for urban development. They are slope, soil characteristics, alternative and competing uses for land and logistical problems. In addition, the study mentions the social and cultural limitations of development. Necessary attributes for urban development include such things as:

> "a functional local government capable of economically providing necessary services (including effective growth control) and utilities....and, "cohesive and identifiable neighborhoods within the community."[1]

Resolution of the many issues relating to development is no straightforward matter as the Council of Governments' study makes clear. The actual choices made about development are very clear evidence of the values and concerns that people have for the future of their area. The need to protect these values and alleviate these concerns further justifies development of a mitigation program. A successful mitigation program requires a foundation that includes continuing communication and cooperation among local, regional and state levels of government as well as between industry and these elements; a positive attitude toward development and mitigation programs; and effective planning and implementation processes at these levels. A strong planning program needed to resolve issues and to mitigate adverse developmental impacts requires considerable effort from all levels of local, regional and state government as well as industry cooperation. Such a program requires direction in the form of goals, objectives and action programs as well as an implementation commitment in order to be successful. The alternatives to planning and growth management, however, are increased costs, political conflict, excess energy consumption and adverse social and environmental affects.

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[1] Colorado West Area Council of Governments, September 1974, p. 40.

D. Mitigation Approaches and Alternatives

1. Planning Programs at the Regional Level

The structures and processes that currently exist at the local and regional level lend themselves to carrying out a successful mitigation program for the impacts resulting from the C-b Shale Oil Project. A number of groups have set goals and presented suggestions for achieving their goals. A significant agency which is operating at a regional level is the Colorado West Area Council of Governments which grew out of the Oil Shale Regional Planning Commission. The Council of Governments recently suggested five broad goals for managing area growth. They are:

- To develop a capability at all levels of government to deal with growth -- and perhaps temporary decline -- in the region.
- To achieve a manageable rate of growth sufficient to counter economic decline.
- To foster a diversified growth which is economically and socially balanced.
- To control the rate and type of growth so that adverse public and social costs are minimized and a suitable regional pattern is achieved.
- To preserve a choice of life styles in the region, including the maintenance of the existing rural and small town way of life.[1]

The Council of Governments made numerous recommendations for achieving these growth management goals. Included among the recommendations are several special studies, creation of an information base, measures to keep prime agricultural lands in use, suggestions for transferring funds between local governments, governmental assistance for diversification and several options for taxation of oil shale production.

More recently the Colorado West Area Council of Governments presented a series of goals, objectives and action programs primarily reflecting goals established by the Oil Shale Regional Planning Commission. These recommendations are presented in their entirety as they represent a most concise set of mitigation procedures for the regional level.

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[1] Colorado West Area Council of Governments, September, 1974, p. 55.

RECOMMENDED GOALS AND OBJECTIVES

GOAL:

DEVELOP A REGIONAL LAND USE PATTERN WHICH DISTRIBUTES POPULATION AND EMPLOYMENT WHERE DESIRED, WHICH CLUSTERS URBAN DEVELOPMENT FOR THE MOST EFFICIENT USE OF URBAN SERVICES AND WHICH PRESERVES THE EXISTING OPEN CHARACTER OF THE REGION.

OBJECTIVES:

1. Develop a regional comprehensive plan and encourage the development of achievable comprehensive plans at the local level.

   Action Programs

   a. Amend the Mineral Leasing Act so that oil shale lease money can be used for a variety of purposes including planning.

   b. Seek state, federal and industry funds for use of individual communities for planning.

   c. Increase local funding for planning.

2. Cluster new development around established communities desiring growth or establish self-sufficient well located new communities.

   Action Programs

   a. Adopt utility extension policies which will direct the location of new growth.

   b. Develop and adopt local zoning and subdivision controls.

   c. Develop joint city-county development policies on growth near urban areas.

3. Minimize the conversion of agricultural lands to urban areas.

   Action Programs

   a. Sponsor legislation allowing for assessment of agricultural land on the basis of agricultural value rather than urban development potential.

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1. Colorado West Area Council of Governments, March, 1975, pp. 28-35.

b. Acquire development rights on critical agricultural land.

GOAL:

DEVELOP A MANAGEMENT CAPABILITY AT ALL LEVELS OF GOVERNMENT TO DEAL WITH GROWTH (AND PERHAPS TEMPORARY DECLINE) IN THE REGION.

OBJECTIVES:

1. Develop and train local and regional staff to address area problems.

   Action Programs

   a. Establish standards for personnel classes and seek to fill positions according to standards.

   b. Establish training programs within the region for present personnel.

   c. Search out sources of funding for more and better qualified personnel.

2. Develop a readily available regional information storage and retrieval system that will facilitate better decision-making at all levels of government.

   Action Programs

   a. Establish role of "key census person" for Region 11 with the Colorado West Area Council of Governments.

   b. Standardize and collect regional land use information at county and regional levels.

   c. Collect and maintain regional socio-economic data.

GOAL:

DIVERSIFY THE REGIONAL ECONOMY IN THE FACE OF CONTINUED ENERGY RESOURCE DEVELOPMENT.

OBJECTIVES:

1. Atract non-oil shale related industry and employment and direct it to those communities that want it.

Action Programs

a. Establish industrial promotion committee on a regional level and for larger cities.

b. Explore feasible industrial inducements for industry.

   (1) Free or low cost land.

   (2) Tax abatement programs.

   (3) Public provision of needed access or utilities.

c. Develop an information program on industrial locations and advantages of area.

d. Review each community wanting industry to determine feasibility of attracting industry.

GOAL:

DEVELOP METHODS OF FINANCING AND SOURCES OF REVENUE WHICH WILL ALLOW THE PROVISION OF ADEQUATE PUBLIC SERVICES AND FACILITIES REQUIRED BY GROWTH.

OBJECTIVES:

1. Develop sources of funding for public services other than the property tax.

   Action Programs

   a. Amend the Mineral Leasing Act to allow oil shale lease monies to be spent for a variety of public uses in region.

   b. Seek out federal and state funds either as grants or as matching funds for local services and facilities.

   c. Explore use of revenue or general obligation bond issues for providing needed facilities.

   d. Amend local regulations and policies to require developer to pay initial cost for installation of needed public facilities in new areas.

   d. Channel emergency funding to growing communities with a demonstrated willingness to plan and manage growth.

GOAL:

PROVIDE SAFE AND SANITARY HOUSING FOR ALL INCOME LEVELS IN A TIMELY FASHION.

OBJECTIVES:

1. Involve units of government at all levels in the provision of housing, particularly for low and moderate income families and individuals, that cannot be provided by the private market.

   Action Programs

   a. Establish local housing authorities at the county and city level with adequate powers and staff to meet local housing needs.

   b. Inventory all federal and state housing programs and interpret for local jurisdictions.

2. Encourage the development of local private housing construction capability.

   Action Programs

   a. Review local codes and ordinances (zoning, building, housing, subdivision, annexation) for their impact on housing costs. Eliminate red tape and "harassment" provisions.

   b. Develop PUD or other techniques which encourages a housing mix and good housing design.

   c. Establish locational and design criteria for mobile home areas, apply them uniformly throughout the region thus permitting this housing type under adequate safeguards.

GOAL:

ACHIEVE A LEVEL OF EDUCATIONAL OPPORTUNITY WITHIN THE REGION WHICH ALLOWS THE FULL DEVELOPMENT OF THE CAPABILITIES OF AREA CITIZENS.

OBJECTIVES:

1. Maintain strong local control over primary and secondary education in the area.

2. Utilize area educational facilities to the greatest extent possible for area citizens.

   Action Programs

   a. Establish vocational training programs at area high schools and community colleges to fit local people for local jobs and for personal advancement, satisfaction and economic gain.

   b. Establish extension courses in existing institutions to provide continuing college level education.

3. Develop a means to equitably distribute energy induced revenues to areas of school impact.

   Action Programs

   a. Prepayment of taxes or outright grants by industry for educational purposes.

   b. Channel oil shale tract lease monies to school districts with increasing student enrollment but no industrial tax base.

GOAL:

CREATE A CHOICE OF LIFE STYLES IN THE REGION INCLUDING THE MAINTENANCE OF THE EXISTING RURAL AND SMALL TOWN WAY OF LIFE.

OBJECTIVES:

1. Maintain a strong agricultural sector to the regional economy.

   Action Programs

   a. Establish and maintain agricultural or open zoning on prime agricultural lands.

2. Develop decidedly urban areas with urban amenities in appropriate locations.

   Action Programs

   a. Through zoning, encourage well designed areas of higher densities.

3. Develop a regional recreation and open space system incorporating federal, state and local open space lands.

   Action Programs

   a. Undertake regional and local open space plans.

   b. Require needed open space dedication or cash in lieu thereof as a condition of development.

   c. Investigate federal funding for open space and use where applicable.

   d. Develop local acquisition and funding programs to acquire open space in advance of need.

e. Identify and protect areas of unique archaeological, geological, historical, scenic, hazard or natural areas. Use HB 1041 funds where possible.

GOAL:

MAINTAIN THE LEVEL AND QUANTITY OF SERVICES IN THE REGION AT AN ADEQUATE STANDARD CONSISTENT WITH CITIZENS' DESIRES AND ABILITY TO PAY.

OBJECTIVES:

1. Raise the level and expand the scope of health care services within the region.

   Action Programs

   a. Establish and maintain a comprehensive health planning program at the regional level.

   b. Institute training programs for supportive health, hospital and nursing home personnel.

   c. Conduct an inventory of non-available but needed health care services and facilities and establish priorities and methods for providing them.

2. Develop the technical expertise and funding at the regional and local levels to deal with water, sewer and solid waste problems.

   Action Programs

   a. Support continuation of federal funding for water, sewer and solid waste projects.

   b. Add qualified people to the regional staff and make available to local units of government.

   c. Raise level of equipment and facilities as funds permit.

3. Develop a balanced, multi-model transportation system capable of meeting the diverse needs of the region.

   Action Programs

   a. Develop a regional transportation plan as a part of the regional plan.

   b. Continue to support the completion of I-70 as an important carrier of people and goods.

c. Improve and supplement existing north-south facilities and facilities leading to energy resource sites.

d. Maintain and improve Walker Field as the regional airport.

4. Improve the level of safety and emergency services.

Action Programs

a. Establish and administer a Criminal Justice Planning Program at the regional level.

b. Develop training programs for police, fire, and emergency personnel.

c. Develop procedures for mutual assistance between local safety and emergency organizations.

d. Develop adequate two-way radio coverage for the region for safety and emergency vehicles and personnel.

2. Planning Programs at the Local Level

The counties and towns that will be most directly affected by the C-b Project have been developing policies and plans to manage growth. The following section describes briefly the current status of planning and community development in these counties and towns.

a. Garfield County

Garfield County follows the guidelines for planning and development given in the 1968 General Plan. However, during the last two years the county has adopted county zoning policies which will help preserve environmental features of the area, control industrial development and provide for residential planned unit development (PUD).

Rifle - A number of studies and plans are currently being prepared for the City of Rifle. The city has a planning office and a full-time planner. Subdivision and zoning regulations have recently been upgraded. A sewer study funded under an EPA 201 grant also is in progress. Other studies underway are a land use and open space plan financed through the Colorado 1041 and 701 programs, a capital improvements plan and a municipal street plan. These studies are expected to be formed into a master plan within a year and a half. The city has also enacted an increased tap fee which is currently undergoing citizen review.

Rifle City and Garfield County have generally favorable attitudes toward growth. If planning work continues, the city should be able to accommodate normal growth easily and should have much of the necessary groundwork prepared for a rapid development situation.

b. Rio Blanco County

Rio Blanco County has taken advantage of an $80,000 grant provided by the Lessees of Federal Lease Tracts C-a and C-b. With this money the county contracted with James M. Bowers and Associates to prepare a sketch plan and concept reports for the county and for Meeker and Rangely. The sketch plan has formed the basis for public discussion. It is intended as a major step toward a comprehensive plan for the towns and the county. Twenty-five growth management policies were devised for the county sketch plan and twenty-two each for the towns of Meeker and Rangely.

Meeker - In addition to the sketch plan and related hearings, the town of Meeker has studied its water and sewer systems and proceeded to expand these systems. The water and sewer systems are being expanded in modular sections. Modular construction assures maximum efficiency of the systems by holding costs down while meeting immediate and near-term demands. Six new classrooms are being added to the high school and construction of a new junior high school begins in the spring of 1976.

3. Planning and Mitigation Approaches by the C-b Project

Throughout this document, an effort has been made to detail the impacts resulting from development of an oil shale plant. Though these impacts are mostly projections at this point, some measures have already been taken to prepare for the future. Because the C-b Project is located in Rio Blanco County, the C-b Venture provided $40,000 to the County for planning uses. The staff of the Project has maintained continual communication with local planning personnel in order to keep them abreast of the Project status. Project members are also participating in a growth monitoring system coordinated by the Colorado West Area Council of Governments. The system will provide growth projections and current information on growth. It will lead also to standardized mapping and population accounting procedures within the oil shale region.

The C-b Project has developed a socio-economic program and is committed to its successful completion. The program includes four broad categories that will receive some amount of C-b Venture participation. The categories are:

a. Provision of housing and services for workers and their families;

b. Community and region-wide assistance in securing housing and services related to all Tract C-b induced population;

c. Assistance at the local level with planning and facilitating government programs such as grants; and

d. Aid in carrying out programs to manage growth and to help maintain the quality of life in the area.

These four categories are elaborated in the following sections.

Provision of Housing and Services for Workers

The Venture will aid and assist in the provision of housing and services for workers and their families. Because the demand for housing and services will occur within a short period of time, special arrangements may be required for meeting these demands. Particular arrangements depend on the time at which Project construction begins as well as the amount of lead time available.

Each of the phases of the Project's development will have different housing needs and solutions. The first phase of development will require short-term, immediate action, whereas, the other phases can be managed as parts of one long-term program.

In attempting to accommodate the workers during the Mine Development Phase there appear to be two basic alternatives for which to plan. The first would be a temporary camp on or near the Tract. The second approach would be to utilize mobile home park accommodations in either of the two towns. It is the Lessee's intention to work with the local planning processes in order to assess the best direction to take. At this point it seems reasonable to plan for acceptable mobile home parks to house the workers and their families. The Lessee will also work with the local entities to see that public transportation can be provided in order to facilitate travel and to minimize problems related to increased traffic on Highway 13 and the Piceance Creek Road. The Lessee would also cooperate to assure that necessary municipal and human services are adequately provided to meet the demands during this phase.

There appear to be two basic planning strategies for accommodating workers and their families during the next two Project phases which will generate the largest number of workers. The first strategy includes development of a new town in either county. The second and most probable approach is to work with Meeker and Rifle to attract and accommodate workers in accordance with growth plans for these two communities. This again emphasizes the need to work closely with the local communities in order to assure that our plans are consistent with theirs and to assure timely and satisfactory community development.

Community and Region-wide Assistance

The Venture intends to work with the local communities to facilitate the provision of housing, municipal services and human services for the total induced population related to Tract C-b development. How industry can best participate in the provision of these facilities can be determined when the need for them is established. Suggestions for industry participation have included underwriting mortgage financing, purchase and resale of community development lands at cost, making housing preparations for other parts of the population at the same time that housing for workers is being readied, participating in a community development corporation, direct financial participation and pre-payment of taxes.

Government participation in community development may offset industry's role in the process. Another factor that should not be overlooked is the oil shale lease funds that have been paid by the Venture and are currently being held by the state. These funds should be effectively and efficiently utilized to manage impacts related to oil shale development.

Assistance at the Local Level with Planning

The Venture has worked closely with planning staffs at the local level in preparing this report as well as sharing information and recommendations for development. The Venture intends to assist in providing technical services at the local level, as requested, to monitor population, regulate growth, choose appropriate land use options, study particular problems, apply for government aid and work out methods for financing necessary development projects.

Development of Specific Programs

Aside from programs for workers at the Project, the Venture intends to provide information for vocational training and retraining, work with other industry on construction scheduling, facilitate human services programs, participate in a growth monitoring system, aid in comprehensive and transportation planning and develop a program to hire as many local people as possible.

The exact nature of industry participation will depend on community and regional needs as well as the status of the Project. However, the Venture is committed to a successful socio-economic program and will work to achieve this end.

E. Summary

A number of impacts resulting from the C-b Shale Oil Project have been identified. Current structures and processes, as well as anticipated revisions of current policies at the state, regional and local levels will lead to successful mitigation of many of the impacts related to rapid development. Effective governmental action, coupled with the Venture's efforts to cooperate with and assist local and regional entities in alleviating socio-economic impacts, will assure a well ordered community development process.

SOURCES

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SOURCES FOR THE IMPACT ANALYSIS

CHAPTER I: GENERAL INTRODUCTION AND SUMMARY

Bickert, Browne and Coddington and Associates, Inc. 1975. *Attitudes and Opinions Related to the Development of an Oil Shale Industry*. Prepared for the Oil Shale Regional Planning Commission and the Colorado West Area Council of Governments. July.

Real Estate Research Corporation. 1974. *The Costs of Sprawl: Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe*. Prepared for the Council on Environmental Quality, Department of Housing and Urban Development and the Environmental Protection Agency. U. S. Government Printing Office: Washington, D. C. April.

CHAPTER II: EMPLOYMENT AND POPULATION BUILDUP

Gilmore, J. S. and M. K. Duff. 1973. The Oil Shale Regional Economic Base (Garfield, Mesa and Rio Blanco Counties). Working Paper No. 1. Prepared for The Oil Shale Regional Planning Commission. Rifle, Colorado.

_____________. 1975. Growth Management Case Study: Sweetwater County, Wyoming. Denver Research Institute: Denver, Colorado.

Interviews:

United Mine Workers of America, District Number 15, Denver, Colorado, December, 1975.

CHAPTER III: POPULATION DISTRIBUTION: PROJECTED SETTLEMENT PATTERNS

McDowell-Smith and Associates. 1975. Evaluation of Selected Community Needs: Rifle and Boulder, Colorado.

CHAPTER IV: HOUSING, MUNICIPAL AND HUMAN SERVICES: RIFLE

Bowers, James M. and Associates. 1974. Housing Report. Prepared for Colorado West Area Council of Governments. January.

Bureau of Land Management, Department of the Interior. 1975-1976. Northwest Colorado Coal Draft Environmental Impact Statement. Craig District.

Colorado Department of Health. 1975. Colorado State Plan for Construction of Hospitals and Health Facilities.

Colorado Department of Highways, Planning and Research Division. 1973. Rifle External Origin and Destination Study, Project FO 13-1(21).

_______________. 1973. Air Quality Analysis through Rifle, Project FO 13-2(21). April.

De Chiara, Joseph and Lee Koppelman. 1975. Urban Planning and Design Criteria. Von Nostrand Reinhold Company: New York, New York.

Mc Dowell-Smith and Associates. 1975. Evaluation of Selected Community Needs. Rifle and Boulder, Colorado.

United Banks. 1974. "Rifle, Colorado: An Economic Overview."

U. S. Bureau of the Census. Current Housing Reports. 1975. Housing Vacancies, Series H-111-75-2. U. S. Government Printing Office: Washington, D. C. August.

VTN, Colorado. 1975. Socio-Economic and Environmental Land Use Survey for Moffat, Routt and Rio Blanco Counties. Prepared for W. R. Grace and Company. April.

Interviews:

Ron Bausch, Director, Garfield County Libraries, Glenwood Springs, Colorado.

Lynn Behrns, Planner, Rifle City Planning Office, Rifle, Colorado.

Dr. Dariel Clark, Superintendent of Schools, W. Garfield County School District, RE-2, Rifle, Colorado.

Robert Georgeson, Administrator, Claggett Memorial Hospital, Rifle, Colorado.

First Colorado Corporation, Rifle, Colorado.

Greeley Gas Company, Denver, Colorado.

Michael Kuntupis, Rifle City Councilman, Rifle, Colorado.

Interviews (Continued)

Ken Marshall, Rifle Mobile Homes, Rifle, Colorado.

Sam Miller, Western Slope Gas Company, Denver, Colorado.

Rifle City Fire Department, Rifle, Colorado.

Rifle City Police Department, Rifle, Colorado.

Rifle Realty, Rifle, Colorado.

Steve Schmitz, Colorado West Area Council of Governments, Rifle, Colorado.

Louis Supancic, Public Service Company, Denver, Colorado.

CHAPTER V: HOUSING, MUNICIPAL AND HUMAN SERVICES: MEEKER

Bureau of Land Management, Department of the Interior. 1975-1976. Northwest Colorado Coal Draft Environmental Impact Statement. Craig District.

Bowers, James M. and Associates. 1974. Housing Report. Prepared for Colorado West Area Council of Governments. January.

______________________________. 1975. Rio Blanco County, Meeker, Rangely: Sketch Plans. Denver, Colorado. June.

Colorado Department of Health. 1975. Colorado State Plan for Construction of Hospitals and Health Facilities.

De Chiara, Joseph and Lee Koppelman. 1975. Urban Planning and Design Criteria. Van Nostrand Reinhold Company: New York, New York.

Office of the Governor of Colorado. 1974. IMPACT: An Assessment of the Impact of Oil Shale Development -- Colorado Planning and Management Region 11, Volume III, Human Services Other than Health. December.

Merrick and Company, 1974. Facilities Plan: Meeker Wastewater Treatment Plant, Meeker Sanitation District.

Mountain Plains Federal Regional Council, United States Environmental Protection Agency. 1975. Socioeconomic Impacts and Federal Assistance in Energy Development Impacted Communities in Federal Region VIII. Socioeconomic Impacts of Natural Resource Development Committee. July 25.

VNT, Colorado. 1975. Socio-Economic and Environmental Land Use Survey for Moffat, Routt and Rio Blanco Counties. Prepared for W. R. Grace and Company. April.

Wright-McLaughlin Engineering Company. 1975. Water Facilities Improvement Feasibility Report. Prepared for the Town of Meeker.

Interviews:

James Calhoun, Town Manager, Meeker, Colorado.

Colorado Department of Highways, Denver, Colorado.

William Goosman, Goosman Realty, Meeker, Colorado.

Greeley Gas Company, Denver, Colorado

Insurance Services Office, Denver, Colorado.

Interviews (Continued)

Robert King, Superintendent of Schools, Meeker School District, RE-1, Meeker, Colorado.

Merrick and Company, Denver, Colorado.

Sam Miller, Western Slope Gas Company, Denver, Colorado.

Louis Supancic, Public Service Company, Denver, Colorado.

Duane Rehborg, Planner, Rio Blanco County, Colorado.

Pioneers Hospital, Administrative Office, Meeker, Colorado.

Wright - McLaughlin Engineering Company, Denver, Colorado.

CHAPTER VI: DEMAND AND COST IMPACT PROJECTIONS FOR HOUSING, MUNICIPAL AND HUMAN SERVICES

Bureau of Land Management, Department of the Interior. 1975-1976. *Northwest Colorado Coal Draft Environmental Impact Statement*. Craig District.

Colorado Department of Health. 1975. *Colorado State Plan for Construction of Hospitals and Health Facilities*.

Colorado West Area Council of Governments. 1974. *Oil Shale and the Future of a Region: Garfield, Mesa and Rio Blanco Counties, Colorado, A Summary Report*. September.

De Chiara, Joseph and Lee Koppelman, 1975. *Urban Planning and Design Criteria*. Van Nostrand Reinhold Company: New York, New York.

Federation of Rocky Mountain States, Inc. 1975. *Educational Profiles of Five States: Data on Student Enrollments and Degrees, Preliminary Draft*. July.

Gilmore, J. S. and M. K. Duff. 1975. *Growth Management Case Study: Sweetwater County, Wyoming*. Denver Research Institute: Denver, Colorado.

Kohrs, ElDean. 1974. "Social Consequences of Boom Growth in Wyoming," a paper given at the Rocky Mountain American Association for the Advancement of Science Meeting, April 24-26, 1974, in Laramie, Wyoming.

Merrick and Company. 1974. *Facilities Plan: Meeker Wastewater Treatment Plant, Meeker Sanitation District*.

Marshall Kaplan, Gans and Kahn. 1975. *Cost Estimates for a New Town Related to Colony Development Operation*. Prepared for The Oil Shale Corporation (unpublished manuscript).

Mc Dowell-Smith and Associates. 1975. *Evaluation of Selected Community Needs*. Rifle and Boulder, Colorado. August.

Office of the Governor of Colorado. 1974. *IMPACT: An Assessment of the Impact of Oil Shale Development -- Colorado Planning and Management Region 11, Volumes I and III, Executive Summary and Human Services Other than Health*. December.

Real Estate Research Corporation. 1974. *The Costs of Sprawl: Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe*. Prepared for the Council on Environmental Quality, the Department of Housing and Urban Development and the Environmental Protection Agency. U. S. Government Printing Office: Washington, D. C. April.

Real Estate Research Corporation. 1974. The Costs of Sprawl. Executive Summary. Prepared for the Council on Environmental Quality, the Department of Housing and Urban Development and the Environmental Protection Agency. U. S. Government Printing Office: Washington, D. C. April.

Robert Snow Means Company, Inc. 1975. Building Construction Cost Data: 1975. Robert Snow Means Company, Inc.: Duxbury, Massachusetts.

THK Associates, Inc. 1974. Impact Analysis and Development Patterns Related to an Oil Shale Industry. THK Associates, Inc.: Denver, Colorado. February.

U. S. Bureau of the Census. 1975. Federal-State Cooperative Program for Population Estimates - Series P-26, No. 103. Estimates of the Population of Colorado Counties and Metropolitan Areas: July 1, 1973 and July 1, 1974. April.

VTN, Colorado. 1975. Socio-Economic and Environmental Land Use Survey for Moffat, Routt and Rio Blanco Counties. Prepared for W. R. Grace and Company. April.

Interviews:

William Adrian, Lindsey Baldgner and Jerome Wartgow, Colorado Commission on Higher Education, Division of Planning, Denver, Colorado.

Bruce Bartlett, Former Director, Community Group Homes, Denver, Colorado.

Colorado Department of Highways, Office of Accounting, Denver, Colorado.

Colorado Department of Social Services, Division of Rehabilitation, Glenwood Springs Office, Glenwood Springs, Colorado.

Colorado Division of Correctional Services, Office of Research and Planning, Denver, Colorado.

Colorado West Area Regional Mental Health Center, Business Office, Glenwood Springs, Colorado.

Rita Dingman, Colorado Department of Health, Division of Nursing, Denver, Colorado.

Sonny Emerson, Director, Denver Community Center, Denver, Colorado.

Charles Erickson, Probation Officer, Glenwood Springs, Colorado.

First Colorado Corporation, Rifle, Colorado.

Paul Foster, Western Regional Planner, State Board for Community Colleges and Occupational Education, Denver, Colorado.

William Goosman, Goosman Realty, Meeker, Colorado.

Ray Haiduck, Office of Research, Colorado Division of Juvenile Parole, Denver, Colorado.

Donald Johnson, Chief, Littleton Fire Department, Littleton, Colorado.

Ronald Johnson, Garfield County Department of Social Services, Glenwood Springs, Colorado.

Lyle Kohler, Insurance Services Office, Denver, Colorado.

Chuck Mackie, Director of Vocational Education, Denver Public Schools, Denver, Colorado.

Carrol Multz, District Attorney, Fourteenth Judicial District, Moffat County Courthouse, Craig, Colorado.

David Norman, Director, Area Agency on Aging, Grand Junction, Colorado.

Rifle Realty, Rifle, Colorado.

Richard Steele, Juvenile Parole Officer, Grand Junction, Colorado.

Wright-McLaughlin Engineering Company, Denver, Colorado.

CHAPTER VII: IMPACTS OF THE PROPOSED ACTION ON THE REGIONAL ECONOMY

Governor's Committee on Oil Shale Environmental Problems, Regional Development and Land Use Planning Subcommittee. 1974. Tax Lead Time Study for the Oil Shale Region: Fiscal Alternatives for Rapidly Growing Communities in Colorado. Colorado Geological Survey: Denver, Colorado.

Interviews:

Colorado Department of Labor, Denver, Colorado.

Colorado Department of Revenue, Division of Research and Statistics, Denver, Colorado.

Colorado Division of Property Taxation, Denver, Colorado.

Colorado Legislative Council, Denver, Colorado.

Jack Gilmore, University of Denver Research Institute, Denver, Colorado.

CHAPTER VIII: MITIGATION PROCEDURES

Colorado West Area Council of Governments. 1974. Oil Shale and the Future of a Region: Garfield, Mesa and Rio Blanco Counties, Colorado, A Summary Report. September.

________________. 1975. Concept of a Region: Garfield, Mesa and Rio Blanco Counties, Colorado. March.

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